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THE Monthly Cyclopædia OF Practical Medicine AND UNIVERSAL MEDICAL JOURNAL.

EDITED BY
CHARLES E. de M. SAJOUS, M.D.,
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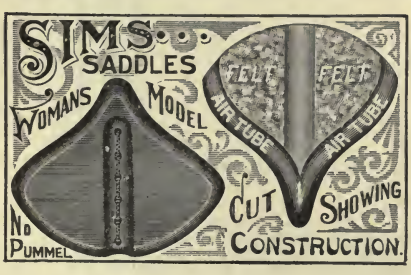

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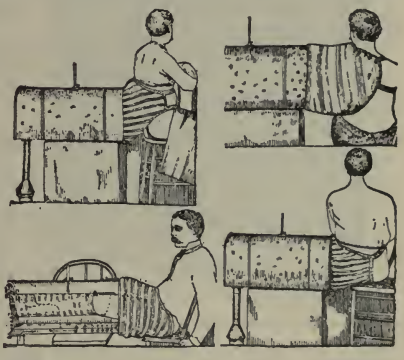

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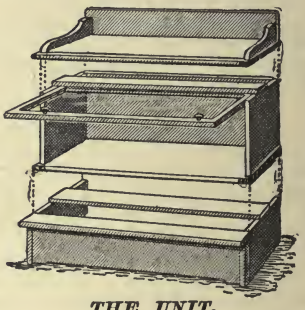

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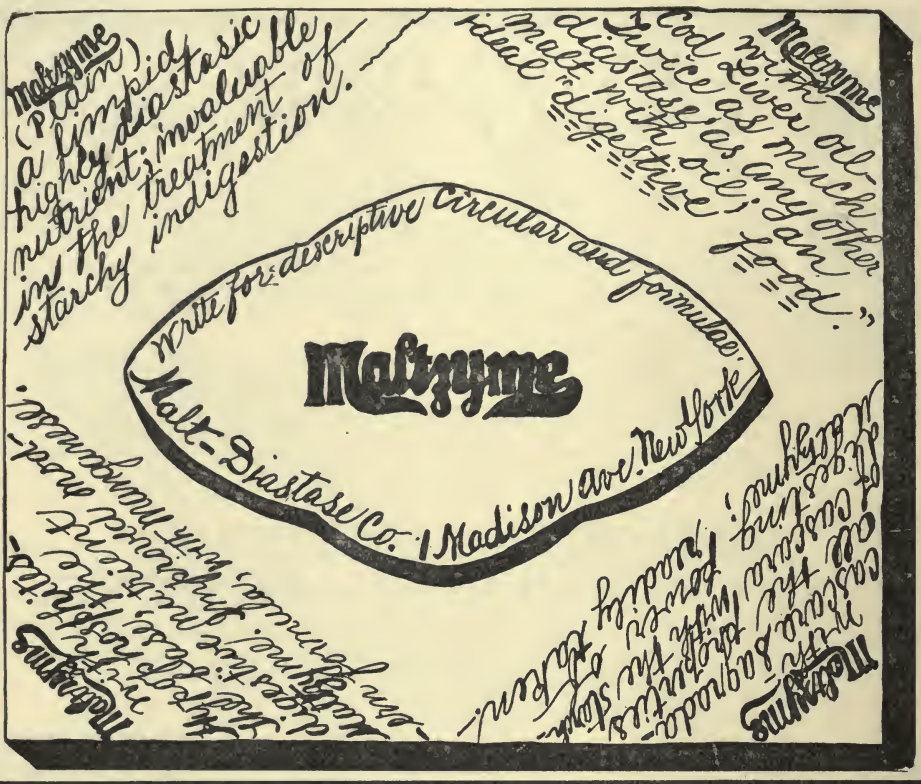

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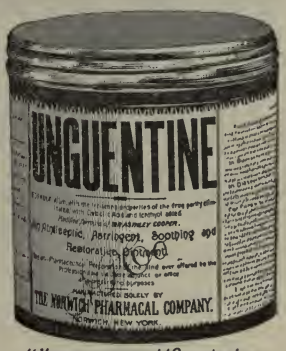

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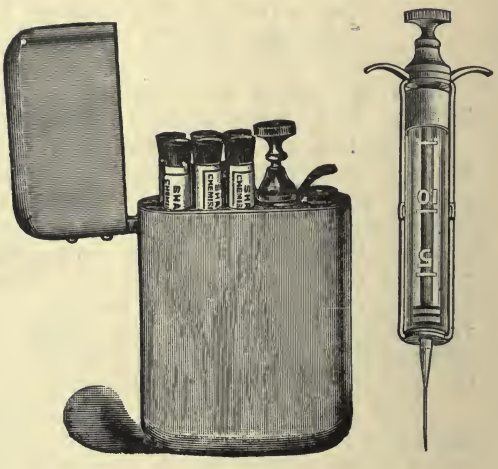

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Introductory Notice.

THE Spanish military death-rate in Cuba, published by Dr. W. F. Brunner in the Medical News of May 7, '98, gives the total number of deaths as 32,534 for the year 1897, the majority of which were due to preventable diseases. As American troops are soon to be sent to that country, the editor deemed it expedient to utilize the vast store of information that the editorial offices of the ANNUAL afford to

collate all suggestions calculated to thwart the pernicious effects of the Cuban climatic and telluric conditions, and the best remedial means for the diseases which they engender. This issue contains an editorial review of the situation; an analytical list of the best *succedaneæ* for quinine and other cinchona salts—in case the supply of the latter should, at any time, fail; the most advanced ideas upon the treatment of Burns and Scalds and Insolation. The next issue will be devoted to the treatment of Tropical Dysentery and Diarrhœa, Gunshot and other Wounds, Venomous Wounds and Stings, and other conditions that may threaten the lives of the brave men who have gone to the front. The editor feels that the readers of the Monthly Cyclopædia will approve of this, and that they will excuse the momentary change of form which the presentation of these articles will involve.

Editorial.

MALARIA AND THE CUBAN CAMPAIGN.

In the spring of 1895 the writer witnessed the departure from Paris of the Two Hundredth Infantry for Madagascar. Beaming with anticipations of a glorious campaign, the young soldiers composing the regiment seemed capable of any physical effort; robust, agile, and merry, they appeared able not only to defy the efforts of any human foe, but also to remain invulnerable to the onslaught of a much more potent enemy: the noxious emanations of marsh-lands and pools. The campaign was pushed with energy; but some months later every Parisian's heart was stirred to the utmost by the return of the same regiment, or, rather, what was left of it: a handful of gaunt, yellow "convalescents," several of whom were soon to follow the nine hundred and odd comrades who had preceded them in the other world. The human antagonist had been a myth; the subtile earth- and water-borne enemy had done it all.

The Spaniards have already said that their strongest allies would be the febrile diseases of Cuba: yellow fever and malaria. We have no reason to disagree with them, and, if the disastrous Madagascar campaign is taken as *theme*, it is because from the sanitary aspect there is a striking analogy between it and the Cuban campaign upon which we have just embarked. Geographically, Madagascar and Cuba may be called "sister-isles": the former is centrally traversed by the 22d degree of latitude south, the latter by the 22d degree of latitude north. Both lie to the southeast of the main-land; both are surrounded by warm ocean-currents; both are paradises of fertility—studded with hot-beds of decaying vegetable matter, marshes, and swamps. When the resisting powers of the French and American forces are compared, they may be said to be very similar: the Foreign Legion, of France, is represented by our regulars; the French regiments of the line, made

up of men between 21 and 24 years of age, about correspond to our volunteers, ranging in age from 21 to 35, who compensate through their greater proximity to full development for the superior physical training of the French troops,—which, by the bye, malaria in no way respects. As to the sanitary organization, the French medical corps was severely criticized by the lay press when the deplorable condition of the troops was made known; how far this was warranted it does not belong to us to state, but it can safely be asserted that a more loyal and better-versed corps of military surgeons can be found nowhere. The fact remains, however, that if such results are possible with a medical corps organized on a permanent footing to satisfy the needs of a standing army of half a million men, to expect perfect service from a corps such as ours, elaborated for an army of twenty-three thousand men and suddenly increased to one of nearly two hundred thousand, is certainly paying Surgeon-General Sternberg a high tribute: one, indeed, which he truly merits.

The picture witnessed at Madagascar, however, can but suggest the possibility of similar experience in our case. A review of the main features of the French expedition may, therefore, prove instructive.

Among the multitude of statements published during the Madagascar campaign in connection with the high mortality among the troops, but three general factors seemed to be based on good ground: 1. A certain amount of friction between the army and navy, which indirectly caused vexatious delays and undue retention of troops in malarial districts. 2. Unwarranted subservience of all considerations bearing upon the health of the men to the needs of the expedition. 3. Inadequate application of prophylactic measures as a result of the first two factors.

We have no reason to believe that there exists any friction whatever between our army and navy. As to the absolute subservience of all hygienic considerations to the needs of the campaign, we surmise that no decisive step is taken by the Secretary of War when troops are to be transferred to malarious regions without due consultation with the surgeon-general, and that his advice is the primary ruling factor. As to the third, it is normally eliminated by the absence of the first two drawbacks. We can, therefore, feel that the conditions which have prevailed in Madagascar are not to be feared, *provided our means of prophylaxis are adequate.* But is this the case? Can we rely upon the preventive means dictated by prevailing views to efficaciously protect our troops? We must admit that our confidence becomes suddenly checked at this point. In the editorial offices of the ANNUAL we peruse thousands of papers yearly, and we have learned to fear an exaggerated confidence in the teachings of experimental evidence. We have observed that, since bacteriology has invaded the very confines of pathology, experimental work has overshadowed clinical experience, and what the laboratory does not prove, what experiments do not show, is often refused in practice. If this tendency is not counteracted in the application of sanitary hygiene in the Cuban campaign, we might as well frankly admit that we firmly expect another Madagascar. Our purpose here is to urge that the distinguished members of our profession who are at present at the head of the army, navy, and marine-hospital bureaus be not unduly influenced by experimental evidence in the elaboration of the protective measures to be carried into effect.

Recently a prominent pathologist advanced the statement that at the present time there are only two theories as to the mode of transmission of malarial infection that are worthy of consideration, namely: that it occurs aërially, or by inoculation through the agency of suctorial insects. Such an assertion is quite acceptable when uttered as a theme for discussion before a medical society, but it is a very dangerous one to act upon when prophylactic measures are to be put into effect. True, the organism which is known to produce the fever called "malarial" in mankind has not been found outside of human blood; true, we have not been able so far to produce the disease experimentally by administering drinking-water from malarial places, but *time* has so frequently and so thoroughly contradicted positive assertions based on data of this kind, that negative experimental evidence thus obtained should count for naught when the least practical evidence to the contrary is obtainable. What we really *know* is that there are many factors, objective and subjective, which, acting more or less conjointly, can give rise to malarial fever. Concerning two of these, aërial transmission and inoculation, we know something tangible; a third—the influence of drinking-water—does not occupy so advanced a position; a fourth—the predisposing influence of fatigue and heat—is still less understood; a fifth is hardly recognized: the effect of drenching either by wading across streams or by rain, or bathing in the waters of malarial districts, etc., etc. That does not mean that we do not have evidence to sustain the belief that each one of these etiological elements may play an active part in the process; it simply indicates that the majority of them are not as yet understood. What do such negative experiments as those conducted by Celli and Zeri—the giving of marsh-water as beverage for a prolonged period to a large number of individuals—prove? Had their subjects been submitted to the exhausting effects of military life, long and perhaps forced marches; had they also inhaled "malaria" and used surface-waters from malarial pools as beverage, these investigators would probably have obtained different results. The coincidence of arduous field-service and fever has often been noticed; so great an authority on these matters as Laveran places transmission by drinking-water at the head of the list of pathogenic factors, and he has shown that malarious countries have been traversed with impunity by drinking only boiled water. Dr. Smart, of the United States Army, has witnessed the improved condition of troops suffering from malaria as soon as purer water-supplies had been afforded; our esteemed colleague, Dr. Shrady, editor of the New York Medical Record, has emphasized it.

While laying stress upon factors which may not have received the attention due them, our aim is not to undervalue those to which pathologists attribute the active rôle as intermediaries. Indeed, the Madagascar campaign affords a striking lesson as regards the importance of aërial transmission. To facilitate the transportation of baggage into the interior of the island, the French government had supplied its troops with metallic wagonettes, so constructed that they could be floated across streams. For one cause or another it was soon found that they could not be used, and the construction of a cross-country road was determined upon. The young soldiers were put to the task, and bravely and uncomplainingly they worked. Soon, however, the sick-list increased, and, by the time the road was finished, the mortality-list had become appalling. Why the military authorities

permitted this when natives could be had to do the work it would be difficult to explain. To us, the lesson taught by this holocaust of victims is that under no circumstances should unacclimatized men be employed to work the soil. "Europeans must not attempt to work the ground in the intertropical regions" writes Medical Director Maurel of the French navy; "it is death to them, but it does not injure negroes or other natives, who should be secured for this purpose." The importance of aërial transmission is further shown by Dr. Maurel's personal observations. In Africa he had spent nights tramping in the marshes without suffering the least inconvenience, while his assistants suffered from chills: merely because they did not seem to be able, literally speaking, to "keep their mouths shut." He absolutely refrained from talking so as to allow none of the miasmatic air to reach his lungs through the mouth, the nasal passages, as is well known, acting as a sterilizing apparatus through the destructive action of the nasal secretions upon atmospheric organisms.[1]

The bearing of atmospheric conduction upon the prophylaxis of malarial diseases shows itself in many other ways.

The accumulation of malaria near the surface accounts for the generally-recognized fact that people who sleep on the ground-floor frequently suffer, while those who sleep in the upper stories remain unaffected. Hence the recommendation of hygienists to build houses on high places as far away as possible from gas-laden marshes and pools. The influence of accumulation on low levels was well shown recently by Mr. Stanley Kellett Smith, who related, in the Lancet, his observations during an exploration of the country west of Lake Nyassa. It was found that among the men on the march there was a close connection between fairly-rapid alterations of level and the occurrence of malarial manifestations. Whenever the route lay across level or gently sloping country fever was rare, but quick change from high veldt to low veldt and *vice versâ* was always marked by a great increase in the number of attacks. Again, the inhabitants of the Pontine Marshes have learned by experience to sleep on platforms supported on stakes from twelve to fifteen feet high: a practice which is also resorted to in the malarious districts of Greece. These facts sufficiently sustain the advantage of camping troops upon the most elevated ground that can be reached, the tents being so placed as to have their rear face the dominant wind of the region. In bivouacking, hammocks,—readily transportable by cavalry and artillery,—hung as high as possible, materially reduce the chances

[1] I would venture to suggest that we may have, in this prophylactic function of the nasal cavities, a clue to the manner in which the system becomes infected through the respiratory tract. As is well known, to work malarial soil before the sun is well up or after the sun sets is a source of great danger. The pathogenic element, whether it be organic or gaseous (*grundluft*), being widely dispersed through solar heat, the nasal mucus easily disposes of the comparatively few germs present—if such be the active factors. At night the miasmatic air lies low, the proportion of malarial agents is comparatively much greater, and enough pass the nasal cavities to infect the system. This would clear a potent impediment in the way of the air-conduction theory, namely: the fact that malaria is not transported by the winds. It seems plain that strong air-currents should also be able to cause a wide diffusion of malarial elements. This view also accounts for the fact that malaria does not behave after the manner of diseases due to the inhalation of dust. Malaria, on the contrary, is most active on sultry days, when there is no wind, and on days following rain, when the dust cannot rise.

of malarial infection by holding the sleeper, if not entirely above, at least in a comparatively-rarefied part of the malarial stratum.[1]

The evidence in favor of contamination by suctorial insects is no less strong, and the fact that the mosquito can thus transmit the pathogenic element of malaria is gaining ground every day. Two years ago Manson produced, in the human subject, attacks of typical malaria by the imbibition of water inoculated from the bodies of mosquitoes which had bitten persons suffering at the time from malarial fever. Draining of the soil causes mosquitoes to disappear; they enter rooms and are most active at night, and they always fly near the ground, especially around pools. All these features thoroughly associate the mosquito with malarial agencies. According to Bignani, the insect deposits its eggs in water or in damp places; from the eggs are hatched larvæ, which, very voracious, devour everything they encounter, among other things the bodies of the dead mosquitoes and the envelopes from which they emerged. They then pass into the state of nymphæ, from which emerge the young mosquitoes. During this long period of life in damp soil or in water, and especially in the state of larvæ, they impregnate themselves with malarial germs.

Emin Pasha, during his long sojourn in Africa, had, as his constant companion, his mosquito net. The overseers of estates and farms in the Roman Campagna, who less frequently suffer from the fever than their laborers, are especially careful to avoid the bites and stings of insects, particularly during sleep. In autumn the mosquitoes increase after the rains, and so does the fever; both diminish with distinct parallelism.

Practically, mosquitoes probably represent the most trying foe one has to contend with in malarial districts, when rapid changes of camping-grounds are necessary; but, fortunately, the other prophylactic measures required include the selection of high ground, located as far as possible from pools, etc., and, as mosquitoes are absent, or, at least, not so numerous under such conditions, unless winds passing over swamps carry them, the men will frequently obtain moments of respite from their attacks. It is during marches which take in high and low ground, virgin forests, swamps, pools, and shallow streams that the little pests become intolerable, and anyone who has tried under a tropical sun to cover head and hands with mosquito netting knows what Hades might be like: it is something like being stifled and parboiled at the same time. At night, however, netting can be advantageously employed in many ways, even when lying under tents, which seem in no way to prevent their entrance.[2]

---

[1] While traveling in tropical countries I found this method very satisfactory, although it was sometimes difficult to get in and out of the couches. When the trees are too far apart a strong rope can be used as support, each end of the rope being tied to one of the trees. Several hammocks can then be hung to the rope, end to end. To avoid the danger of falling, the edges of the hammock just above the centre should also be attached to the rope above. Two large trees, twenty to twenty-five feet apart, and three pieces of strong Manila rope, placed side by side, can thus serve for ten men. A mosquito net passed over the rope and adjusted around the hammock affords adequate protection against mosquitoes, gnats, flies, etc.

[2] For campaigns in tropical climates, our tents appear to be very deficient. The ground over which they stand allows the "*grundluft*," or "ground-air," upon which German authors lay stress as a prominent etiological factor of malarial fevers, to freely contaminate the air; the interstices under the walls and flys permit the free ingress of reptiles and insects. These

As may be seen, there is solid ground for the belief that atmospheric conduction and inoculation by suctorial insects—the mosquito being probably but one of the active parasites involved—are important—perhaps the most important—elements in the case; but what we wish to emphasize is that other factors, acting simultaneously with the main ones, may prove equally active; sufficiently so, indeed, to counteract prophylactic measures based upon a narrow view of the teachings of experimental work. Interesting in this connection is a report of one of our correspondents upon the methods employed by the Zulus to enable them to resist tropical disease. Experience has taught them that in warm countries frequent ablutions, especially during active perspiration, debilitate the system, and that baths are frequently followed by malarial fever. Copious ablutions in their opinion "open the pores" and facilitate the ingress of the malarial poison; their aim, on the contrary, is to close these avenues for disease-germs, and to insure this they apply fat over the entire body. Our correspondent, Mr. Croonenberghs, during a long residence among the Zulus, determined to test the accuracy of these observations. The results he gives in the following words: "I had obtained this information from Antoine d'Abbadie, of the Institute of France, and certainly found it applicable in South Africa. We both observed its teachings and lived, while all those among my companions who sought relief in the free use of water in Africa died. The three who had, like us, abstained from its use still live." The habit of anointing the body with fat as a prophylactic measure is not limited to the Zulus. A number of African tribes resort to it, and I am told that the blacks in some parts of Guiana and other portions of South America do likewise. Indirect sustaining evidence is also obtainable in the records of explorers.

Are we to infer that the malarial poison is actually absorbed by the skin, or should we attribute the symptoms to the contact during active diaphoresis with water of a lower temperature than that of the body, as is the case in any climate? This answer can only be given when we shall have ascertained the nature of the element through whose intermediary the system becomes infected. The malarial organisms have not been recognized outside the blood of human beings; we know nothing of the life-history of the supposed parasite acting as external factor; we do not even know what malaria-laden air is laden with. Is it a spore, a ferment, a toxin, a gas? We do know, however, that the skin does absorb medicaments and that by cataphoresis we can sometimes cause the taste of a drug applied externally to at once be perceived. Grouping several factors,—(1) the predilection of malarial miasm, whatever that may be, for water,—leading to the natural deduction that a pond, a rivulet passing through a malarial region, etc., is but a solution or a mixture of the infectious element or elements; (2) the reduction of resisting power—whatever that may be—induced in the individual exposed to fatigue; (3) the relaxation of the skin incident upon or following active perspiration,—we can but conclude that there is sufficient ground to warrant at least a strong suspicion that the Zulus

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defects could be easily counteracted by adding to the tent a water-proof canvas base or "floor" sewn to the bottom of the perpendicular canvas ends and sides, and rising in front some inches above the ground under the flys. Such a tent could be closed in on all sides and would afford greatly increased protection against the most active disease-dealing agents Nature supplies in the tropics, and enable the troops to profit, to a great degree, of the hours reserved for rest.

are right, and that the precautions that experience has suggested to them should be followed, with due regard, of course, for habits of cleanliness which characterize Anglo-Saxon civilization. Let it be said, however, that we have in this very quality a source of increased danger. The first impulse of the men when nearing a lake, a pond, a river, after arduous marching under a broiling sun, will be to "plunge in" and by doing so, inhale, drink, absorb, and what not, the element of destruction. How can this be prevented? The answer is: strict discipline as regards the enforcement of sanitary measures emanating from the surgeon-general's office. Cuba is not malarious everywhere. The men will, as much as possible, be camped where malaria is positively known not to exist. Here, of course, the camp-routine may be followed. It is in regions known to be malarious or where the least doubt exists that steps should be taken to protect the men from the effects of their own recklessness. Here, even, there are opportunities which may be taken advantage of to satisfy their bathing proclivities. The Zulus avoid bathing except during heavy rains, but they take advantage of these whenever opportunity offers. After resting, there is no reason why the men should not be allowed to do likewise. During dry weather, however, cleanliness should be obtained by other means. Whatever be the malaria-causing factor residing in water, utilization of all the means we know of would alone insure comparative safety. But the transportation of condensing apparatus for larger quantities of water would, of course, involve considerable difficulty. The next best procedure would be to boil the water; here, however, the chances that "ground-air" would be eliminated would be slight. Accepting "ground-air" as an active factor and not knowing its identity, chemical means cannot come to our aid. We are reduced to the use of small quantities of water for cleansing purposes in miasmatic regions when rain-water is not procurable. Washing the body with a bowlful of the local water, provided carbolic-acid soap be used on the wash-cloth, will, as far as we know, destroy any organism that may be present, while the small quantity of water spread on the surface will contain so small a quantity of "ground-air" as to eliminate any danger of contamination should this happen to be the noxious agent. The carbolic-acid soap will also tend to prevent the attacks of the smaller insects, such as fleas, lice, ticks, etc.

Drinking-water, as we have already seen, merits the greatest attention. In the British service this subject is considered as one of capital importance, but, unfortunately, the manner of satisfactorily supplying sufficient quantities of pure water is far from settled. Dr. R. H. Castellote, in the Lancet of February 12, '98, published notes on the Niger-Soudan campaign of 1896, which not only emphasize this fact, but also give valuable details regarding the use of portable filters. Each man had been supplied, as had been the case in the Ashantee expedition, with a small pocket charcoal filter in a metal case. These were found handy, but they required very frequent cleaning and the "inspiratory power required to get a small result" caused a strong tendency among the men to discard their use. Pasteur-Chamberland filters also required too frequent cleansing and soon had to be abandoned owing to the destructive wear and tear of transportation. Altogether the question of portable filters in the tropics was found to be a difficult one. Dr. Castellote outlines the principal requirements that an expedition filter should present, and furnishes valuable hints based, of course, upon personal observation:—

"A filter should be strong enough to stand the knocking about that things get from native servants and carriers; it should be capable of turning out a large quantity of water in a short time; should be easily taken to pieces for the component parts to be cleaned at frequent intervals (the amount of deposition on the porcelain or charcoal is evidence of the quantity of suspended matter in the water at most places); to be useful at short halts on the march it should be easily set going and packed up again; and, lastly, it must be fairly portable.

"On the whole, probably one of the larger forms of Pasteur-Chamberland filters fitted with pump and with the body made of earthenware or galvanized iron, and securely packed in an outer jacket of wood or wicker-work, would turn out enough water for twenty men in a short time and would answer most of the other requirements. The only point not satisfactory would be its portability. It would form a complete load for one carrier and if of earthenware possibly would have to be carried between two.

"Whenever possible, undoubtedly the best and most certain way of purifying or rather sterilizing water is by boiling. This in itself is sufficient to make the water good and palatable for drinking purposes if it is naturally fairly clear; but if, as usually is the case, there is much suspended organic matter in it, this can be largely removed by straining through fine muslin or a clean pocket-handkerchief before boiling.

"Boiling was the process, on the failure of our filters, that we most generally relied on for getting a drink. Each white man carried a vulcanite water-bottle of about one and a half pints' capacity, covered with felt and fitted with padlock, which was filled up with boiled water, tea, etc., over night. But with thirsty men on a long day's march under a tropical sun it can readily be understood that one and a half pints of fluid did not go very far, and three or four hours generally saw most of the water-bottles empty. After that, one had either to exercise a great deal of self-control or risk drinking unprepared water whenever we came to it. It was not nice and it was not wholesome, but at all events it was wet, and I think the latter quality was the one which recommended itself to many. The vulcanite bottles require careful attention. In a short time, especially if used to carry tea, they acquire a musty, stale odor, which communicated a similar taste to the water. Hot water shaken up with a little clean sand soon disposes of this trouble. The felt coverings absorb a good deal of water, which, on exposure to the sun and wind by evaporation, renders the contents of the bottles very fairly cool. It was customary to dip them whenever we came to water." These are timely hints.

A few words concerning prophylactic measures addressed directly to the blood may not be out of place. That quinine merits, on the whole, the confidence of army-surgeons as a potent prophylactic need not be emphasized; we positively know that the spores of the *plasmodium malariæ* are extremely susceptible to its action, even when the proportion in the blood is minute. But we also know that it occasionally fails, *especially when general measures of prevention are not resorted to.* The conclusion imposed upon us, therefore, is that quinine should occupy an important position in the general prophylactic plan adopted, but that it should not alone be depended on; in other words, none of the other measures should be neglected if its best effects are to be obtained.

What is the best salt to use, what is the quantity that should be employed, and, lastly, what is the best time of the day to administer it to prevent untoward effects, gastric and general? Our late associate editor, Dr. Dujardin-Beaumetz, having announced to the Société de Thérapeutique of Paris that the soldiers about to be sent to Madagascar were to carry with them, for prophylactic purposes, a considerable quantity of quinine, and that it would be desirable to know if one of the salts of that drug were preferable to another, and also which was the most suitable pharmaceutical form for administration, the society appointed a commission to investigate the subject. The result of their studies were embodied in the following conclusions: 1. The basic quinine hydrochlorate is to be preferred as a prophylactic measure, as being sufficiently soluble and containing the largest quantity of the alkaloid. It is also less irritating to the digestive passages than the sulphate. The hydrobromate should be employed in rebellious cases of fever in which the sulphate has failed. 2. The compressed preparations should be absolutely rejected; pills made with a soluble excipient or gelatin capsules seem to be the preparations of choice in preventive treatment. 3. Two pellets or gelatin capsules containing 4 grains of the hydrochlorate may be given daily: one in the morning and one in the evening. This quantity will be sufficient to maintain the organism continually under the influence of the quinine.

For the reasons already outlined, the prophylactic use of quinine was not systematically resorted to during the Madagascar expedition, but a review of the general literature on this subject has shown that the above conclusions coincide with the views of the majority of writers who speak from the stand-point of personal experience. Small doses are not reliable; large doses are apt to be hurtful. Four grains night and morning were found to do no harm, even if administered during long periods, *provided the drug was given during meals.* Administered in this manner, quinine will not even, according to Laveran, irritate the stomach. This author also recommends the hydrochlorate; but he states that it should not be taken with coffee, this beverage causing a portion of the quinine to be precipitated. Thin advises that it be given two days before the malarial district is reached.

In the preceding pages stress has been laid upon the fact that the experimentally demonstrated data at our disposal concerning the etiology of malarial fevers are insufficient to serve as reliable guides in the selection of the proper prophylactic measures to be used in a campaign so fraught with climatic dangers as that just begun; it has been suggested that, by using, in conjunction with these, the protective measures that explorers, expedition surgeons, residents of malarial districts, etc., have found effective,—although the *modus operandi* of these measures be still unexplained,—the efficiency of our life-saving efforts might be enhanced. Finally, it has been shown that a broad view of the question seemed to indicate that the fever-producing elements reached the system in various ways, and that it was only by counteracting simultaneously all the factors acting as intermediaries between cause and effect that we could hope for the best results.

Considered from this point of view, the following prophylactic measures, carried out simultaneously, become necessary in malarial districts to insure adequate protection:—

1. To avoid contamination through the respired air and inoculation by insects:—

Unacclimatized men, white or black, should not be employed for the digging of trenches, the erection of defences, or any other kind of work involving upturning of the soil. Natives should alone be utilized for this work.

High ground should be selected for camp-sites, windward, if possible, of any swamp, pool, stream, etc., that may be in the neighborhood.

The men should sleep as high above the ground as possible (not less than two feet and, if practicable, from twelve to fifteen feet) and be provided with mosquito netting.

While crossing malaria-laden forests, glens, lowlands, swamps, etc., the men should be ordered to avoid talking.

2. To avoid contamination by water:—

When water from malarial regions is alone available for drinking purposes, it should be filtered or, preferably, sterilized by boiling.

Bathing should not be permitted when water from a malarial region can alone be obtained, but washing of the body with such water is permissible, provided carbolic-acid soap be employed.

3. To prevent the development of malarial parasites in the blood:—

Four grains of hydrochlorate of quinine should be administered morning and evening during meals as prophylactic, beginning two days before the malarious region is reached.

4. To conserve the general powers of resistance of the economy:—

Regular and frequent periods of rest should intersperse long marches. Drenching and wading through streams should be avoided when possible. Varied and adequate food should be furnished.

The head should be so protected as to secure a maximum amount of coolness under all degrees of temperature, a head-gear such as the solar tepé being furnished for this purpose.

It is obvious that the necessities of a military campaign greatly restrict possibilities, but the fact remains that the aim should be to do the best that can be done, all things considered. This will certainly be the case with such men as Drs. Sternberg, Van Reypen, and Wyman at the helm, and with the valued collaboration of Dr. Guitéras.

Speaking of malarial diseases, the London Lancet of March 12, '98, very appropriately says: "We are impressed with the lamentable deficiency of exact knowledge which is still manifest notwithstanding all the industry of innumerable observers in the past fifty years." To recognize this is a great step forward; to recognize it in time, before the lesson will have cost us a host of victims, as it did to France during the Madagascar campaign, may, perhaps, do more for our cause than all the armies the country may bring to the front.

Charles E. de M. Sajous.

Substitutes for the Cinchona Alkaloids in the Treatment of Tropical Malarial Diseases.

Considering the chances that the campaign in the tropics against Spain may exceed the limits generally set, and the possibility that the army, or some corps or division thereof, may suddenly and unexpectedly find itself cut off from supplies of cinchona alkaloids,—owing to inability to manufacture sufficiently rapidly or to accidents or exigencies of service,—it has been deemed appropriate to present an alphabetically-arranged *résumé* of the substances known to materia medica that have been employed, with any degree of success, as substitutes. The literature of the subject for considerably more than a half-century, with the evidence accruing thereto, both *pro* and *con*, has been gone over for this purpose.

To further add to the value of the paper, and likewise in order to facilitate reference, these drugs have been divided into two groups, representing their order of value as determined by the evidence. Thus, the first group represents those that may fairly be considered as affording values relatively equal to those of the cinchonas and their alkaloids. Next, those that, while of not so great value, may be fairly depended upon.

It has not been considered necessary to enter upon the classification of malarial diseases, but all are, as it were, grouped under the one title, since to do otherwise would impair the value of the paper for reference, and require a differentiation in application which is always best left to the good sense of the individual prescriber.

DRUGS OF THE FIRST CLASS.

Ammonium Muriate. — This is a remedy of great utility and has been too much neglected. This is the testimony of more than three score of observers in Europe and India. It is especially valuable in those fevers that are of a highly-inflammatory type, but must be given in doses of from 15 to 20 grains.

Liquor ammonia has also been suggested, given in the cold stage to hasten its subsidence. Pereira[1] says, however, that it is only available in fevers of a continued type where all violent action has subsided and the brain does not appear much disordered; here it is occasionally of great service, and its diaphoretic action should be promoted by diluents and warm clothing.

Apiol, the stereopten of the common parsley, is believed by Waring[2] the best *succedaneum* for quinine that has yet been discovered. In pernicious fevers its effects are much more prompt and certain than those of the cinchona salts. Joret and Homolle discovered the foregoing fact more than fifty years ago[3]; but the difficulty of securing a uniform preparation—which is now obviated—caused the remedy to be little employed. Stockwell and Serré corroborate[4] this view.

Arsenic is one of the oldest and best known of remedies in periodic maladies. It has maintained its character for centuries among Eastern nations, and its efficacy has been well established in Great Britain, Europe, and America. In tropical maladies Chapple, as the result of Indian experience, insists that it is as valuable as quinine.[5] Sir Ronald Martin[6] characterizes it as "indeed a

[1] Mat. Med., vol. i.
[2] Prac. Therap.
[3] L'Union Méd., Jan., Feb., '55.
[4] Editorial, Med. Age, '95; Bull. Pharm., '94.
[5] Med. Times and Gaz., Mar. 2, '61.
[6] On Tropical Diseases.

noble remedy." Adamson considers that its powers may be greatly enhanced by combining sesquicarbonate of ammonia (5 grains to 6 minims liquor ammonia to 1 ounce of water), repeated every two or three hours according to the frequency of the paroxysms.[1] M. Boudin, formerly Physician-General to the French troops in Algeria,[2] long ago emphasized its value: "I am assured by successive trials, which have been repeated with similar results by many others, that arsenous acid preserves, in the somewhat microscopical doses of $^1/_{100}$ grain, all its medicinal energy, not only in marsh-fevers, but also in a multitude of other diseases. Further, I have obtained from $^1/_{100}$ grain of this remedy the entire removal of fevers contracted in Algeria and Senegal, and which had previously resisted means of various kinds, including quinine and change of climate. I have been able, in a great number of cases, and by very small doses, to put an end, in a short time, to quotidian, tertian, and quartan fevers, contracted in latitudes the most various, often complicated with chronic enlargements of the abdominal viscera, and which were incurable by quinine." He considers it important to administer the remedy five or six hours before an expected paroxysm, but does not give it if the fever is complicated with bilious or inflammatory disorders.

Roth[3] insists that in malarial fevers and cachexia, especially in inveterate cases, there is no remedy equal to Fowler's solution.

It must be remembered that one great advantage of arsenic, in small or normal therapeutic doses, is that it does not, in any way, interfere with the digestive system, but rather tends to promote digestion; it has no influence upon non-organized ferments either vegetable or animal, including amygdalin, pepsin, pancreatin, etc.

In acute remittent or even acute intermittent it is frequently employed in the West Indies and South America. Ringer[4] accords arsenic a place second only to quinine in the treatment of malarial fevers.

Butler[5] gives arsenic equal rank with quinine, and truly remarks there are few relapses of malarious fevers that have been treated by arsenic; moreover the latter can be administered with as favorable results as quinine would give.

Ricchi[6] was able to test its effects on a large scale in Italian districts where malaria was particularly rife. Of 1963 men treated it appeared to be of little value in acute cases, but proved satisfactory in 1384 that were chronic. To 538 persons who did not suffer from the disease it appeared to be prophylactic, and in the few that subsequently contracted a malarial malady it was invariably of mild type and easily cured by quinine.

Du Cazal[7] indorses the method originally proposed by Boudin, viz.: to administer, at the outset, sufficient of a solution of arsenous acid, 1 to 1000, to equal 1 grain of arsenic, and then continue until symptoms of intolerance appear.

Boneset.—Another drug of considerably more than passing value is boneset (*Eupatorium perfoliatum*), which for more than a century has been a most potent domestic remedy. Goss[8] remarks that it is a very positive antiperiodic,

[1] Edinburgh Med. Jour., May, '62.
[2] Treatise on Intermittent Fevers, Paris, '42.
[3] Mod. Mat. Med., '95.
[4] Hand-book Therap.
[5] Text-book Mat. Med., '97.
[6] Lancet, Lond., Apr. 27, '89.
[7] Jour. des Pract., No. 2, '93.
[8] Mat. Med., Pharm., and Spec. Therap.

and that its direct action upon the secretory functions of the liver and its tonic and diaphoretic properties make it an important remedy. He has known Southern planters to use it in malarial fevers, both for their families and their slaves, with unqualified success.

Archie Stockwell[1] corroborates this opinion of boneset, and has employed it where quinine and arsenic, in spite of all adjuncts, had failed flatly. He prefers the freshly-made infusion, taken either hot or iced, as best suits the palate of the patient, giving preference always to the recently-gathered plant, though the dried and compressed packages are very efficacious. Goss prefers the saturated tincture.

Calaya.—Maurage[2] speaks highly of calaya (*Anneslea febrifuga*) in tropical fevers, as he employed it very extensively in both Tonquin and Madagascar, administering four doses of about 30 grains each of the extract, in syrup. The first dose always reduced the temperature from 1.5° to 2.5°; after the second dose the temperature fell still further. This antipyretic action was not accompanied by any sweating or depression; but, on the contrary, the patients invariably expressed themselves as feeling far better than they had when given quinine in previous attacks. The temperature never fell below normal; and in 3 of 9 cases the fever never returned after the second dose. In 6 there was a subsequent attack, which required four doses to subdue, but the temperature never rose over 101.5° in 5, while in 1 it reached 104.7°. A third treatment was not required in any case. Maurage affirms that calaya is an absolute specific in malarial fevers.

Carbolic Acid.—Treulich[3] states that obstinate intermittents which are not in any way benefited by quinine may be rapidly and permanently cured by carbolic acid; that the drug induces no disagreeable consequence, as is the case in health. He is sustained by Déclat,[4] who treated twenty very obstinate and severe cases, injecting subcutaneously 75 drops of a 1-per-cent. solution: four times the first, three times the second, and twice on the third day. The first injection was usually sufficient to effect a cure, but the subsequent ones were matters of precaution. Treulich gave 4 grains daily, injecting it in a preparation of gentian. Deplats also advised[5] the use of carbolic acid as an antipyretic and antiperiodic. Ringer[6] admits the validity of the recommendations, but adds that the drug is inferior to many other antipyretics, and has a greater effect on the febrile than on the non-febrile temperature. On the whole, it is, perhaps, more safe to side with Wood,[7] who does not consider its use as justifiable, particularly as the preparations in the market are so unstable. The sulphocarbolates may be placed in the same category as the acid. Creasote might be tried; but there is little reason to believe that it is more efficacious than its coal-tar congener.

Chamomile (Roman) appears to still hold its own as a remedy for the malarial fevers of Europe and the West Indies, but requires to be given in doses of 2 drachms. Morton[8] found it most effectual when cinchona had failed; and Cawaigee, of Bombay, as late as 1891,[9] corroborates this, and mentions the fact that it is most available in those forms of malaria accompanied by or developing

[1] Medical Age, '92.
[2] Lancet, Lond., vol. i, '96.
[3] Wien. med. Presse, July 2, '71.
[4] Compt. Rendus, No. 75.
[5] Gaz. Hebd., xvii, '80.
[6] Hand-book of Therap., '97.
[7] Prac. Therap., '94.
[8] De Febribus, cap. iii.
[9] Prac. Vade Mecum.

biliary derangement. Ringer[1] recommends it especially for malarial diarrhœas.

Coffee Arabica.—Little is known medicinally of this agent,—so highly esteemed as a beverage, after it has been roasted and boiled,—yet its original introduction was as a therapeutic agent. A remarkable fact regarding its chemistry is that its alkaloid, caffeine, with the addition of oxygen and the elements of water, yields *taurine*: the nitrogenized compound peculiar to the bile.

In intermittent and other fevers, Gindel and Dorput long ago discovered that coffee acted as a powerful febrifuge. To-day, in Dutch Java, Waring[2] asserts that it is employed in strong infusion with lemon-juice in the virulent fevers of that island. From thence its use has passed to Holland, the Dutch and other West Indies, and even found a foot-hold in Jamaica. In the Dutch possessions Vander-Corput admits that this treatment is considered far superior to that by quinine; Pouquinville states that it is infallible in the malarial fevers of the Morea; and Martin-Solon recommends it in the adynamic forms of typhoid. Many French physicians employ caffeine in fevers; and as this agent is identical with theine, the alkaloid of tea, mate, and guarana; and as kola likewise depends upon it for its chief activity, there would seem to be always at hand, in the tropics, the means for managing the febrile condition. A suggestion that might be offered is that strong, hot lime-juice and infusion of green coffee (3 ounces of Java to 1 ounce of Mocha in 6 ounces of water) be drank on an empty stomach early in the morning; it must be borne in mind, however, that it often causes the urine to look as if the patient had been taking carbolic acid; that is to say, very dark.

Cusparia, or angustura, for more than a century has been employed medicinally in tropical countries. It is the true Angosturu, or Angustura, and must not be confounded with the false form, which is the source of Angustura bitters and belongs to the strychnine group. As this bark is found everywhere in the West Indian shops, where it is known to Spanish Americans as *Orayuri*, though the bark is termed *Carony* (the tree itself is termed *Orayuri*), it is available on any emergency. So valuable is it in low fevers of all kinds that it has become a favorite in many parts of Europe and Great Britain, as well as in India; and, though it is not the least astringent, it is a sovereign remedy for dysentery in all climates. Its disrepute in the United States is due to the fact that, as imported, it is adulterated with false angustura. The physical characteristics of the two barks may be compared sufficiently to permit of ready identification:—

True Angustura.

Flat or curved pieces or quills, 1 to 3 inches long, 1 to ½ inch wide, and ⅛ to ⅛ inch thick; obliquely cut on inner edge. Externally a yellowish-gray, mottled, corky layer, which can be scraped off and shows a dark-brown, resinous layer. Inner surface, light brown, flaky. Fracture, short, smooth, resinous, and under lens showing numerous white glistening striæ of crystals of calcium oxalate. Odor musty and disagreeable. Taste, bitter and aromatic, and when leaves are chewed for some time a sense of heat and pungency in the throat and on the fauces.

False Angustura.

Much the same shape, but more gray in color externally; the cork patches of a rust color; warty. Inside, brown. Fracture smooth, but shows no white striæ of calcium oxalate. Odor rather sweetish than otherwise. Taste, intensely bitter. The inner surface gives bright-red color with nitric acid, owing to presence of brucine, which true angustura does not.

[1] Hand-book, '97.
[2] Prac. Therap.

Pereira[1] states that cusparia is not only valuable in intermittents and remittents, but in the worst bilious forms of the latter, such as occur in the tropics. Williams[2] and Wilkinson and Hancock[3] corroborate this opinion; while Winterbottom[4] is even mo e emphatic, and extols the drug in adynamic continued fever.

According to Waring,[5] angustura (cusparia) may readily be employed as an infusion of 1 to 5, employing the water at 120° F., the dose being from 1 to 2 ounces. The powdered bark may be given in doses of from 10 to 40 grains. A convenient tincture may be made extemporaneously by macerating the dried bark in coarse powder in five times its weight of alcohol. It should be put in a well-stoppered bottle; allowed to stand eight days in a cool place, shaking twice daily; then poured off, strained, and filtered. The infusion is incompatible with metallic sulphates, antimony, lead and mercurial salts, silver nitrate, and infusions containing tannin.

Narcotine, or anarcotine, is a solid, white, inodorous, insipid, neutral alkaloid derived from opium, occurring in crystallized prisms. Its title is certainly a misnomer, for it is devoid of even a trace of narcotic properties, but, on the contrary, it is assertively tonic, febrifuge, diaphoretic, and antiperiodic; it is absolutely, according to a large number of East-Indian authorities, the greatest rival of quinine *muriate,* and far superior to the *sulphate.* O'Shaughnessy states[6] that his personal experiences, and those of many medical officers throughout India, lead to the conclusion that narcotine is, at most, only second to quinine; that it has, moreover, succeeded when the latter drug failed; and in malarias complicated with dysentery the opium alkaloid is incontestably superior. Garden,[7] of the Bengal Medical Service, strongly advocates it as an antiperiodic, and considers the only objection that can be urged against it is a tendency to produce constipation. Biddle[8] declares that the drug is inert as regards narcotic properties, but that it has been used in India as a stomachic and febrifuge in the treatment of malarial fevers. Murrell,[9] of London, recognizes its total lack of narcotic properties, and reaffirms its wonderful antiperiodic powers; in this he also echoes Martindale and Westcott.[10] The former further states that: "It has long been held in India that opium is a remedy for, and a protective against, malarial infection, and the remarkable immunity of opium-eaters from diseases of this type is probably due to the presence of this alkaloid. Sir William Roberts has pointed out that in narcotine we possess an antiperiodic of great power, analogous to, but not identical with, quinine. In India it was for several years regularly supplied from Government factories at the rate of about one hundred weight *per annum,* and considerable quantities of the drug are still to be found in the medical depots of the country. In some cases it is but slightly inferior, and in others distinctly superior to quinine." The dose is 1 to 3 grains; although our text-books state that the dose is $^1/_8$ to $^1/_3$ grain, and that it possesses one-eighth—some say one-third—the strength of morphine.

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[1] Mat. Med. and Therap.
[2] Med. and Phys. Jour., '98.
[3] Med. Facts and Obsv., vii.
[4] Mem. Med. Soc. Lond., iv.
[5] Prac. Therap.
[6] Bengal Pharm.
[7] Lancet, Lond., Jan. 11, '62.
[8] Mat. Med. and Therap., '96.
[9] Manual of Mat. Med. and Therap., '96.
[10] Extra Pharm., '95.

Nitrates.—Nitrate of potash is a very old remedy for fevers. Sawyer[1] finds it successful even when quinine has failed. He gives it in 10-grain doses, with 4 drachms of brandy or water; or, if agreeable to the patient, the powder may be placed on the tongue and allowed to dissolve slowly. He deems it a specific in all malarial fevers, and affirms that with its aid he has never failed to arrest the paroxysm if uncomplicated. Hunter[2] likewise insists upon the efficacy of the drug, which, he declares, cured 65 per cent. of cases, with the administration of a single dose,—35 per cent.,—that had remained uninfluenced by repeated doses. His best results were obtained when the nitrate was given during the premonitory stage in anticipation of the paroxysm. Sawyer,[3] referring to the fact that he had anticipated Hunter (see *ante*), says that he was first induced to try the remedy after having been assured by an old backwoodsman that a large dose of gunpowder, at the beginning of the cold stage, would almost always abort or modify the malarial paroxysm. Gunpowder includes two remedies: for charcoal has also been highly recommended as an antiperiodic (see DRUGS OF SECOND CLASS).

Burg[4] employs both potassium and sodium nitrate indiscriminately, the action of which toward the malarial poison he holds to be identical, though the former has the advantage of being more soluble and less toxic; he gives from 15 to 24 grains in the interval between the attacks or at the onset of an attack. In his experience with the virulent fevers of the Hungarian marshes the "results were variable": the treatment succeeded in some cases and failed in others.

Salicin for a time threatened to be a rival of at least the lesser cinchona salts. It has been highly lauded by many observers. Blom[5] used it extensively: chiefly when quinine seemed ill borne, when the patient was plethoric, prone to vascular congestion of the head or to violent headaches. He ascribes the efficacy of the drug to a peculiar operation on the mucous membranes, "of which it elevates the tone while improving the character of the secretions." He also praises it in fevers of continued and purely-remittent type. Equally enthusiastic is Pleischl, of Prague[6]; and Goss[7] remarks that, though inferior to quinine, it is more valuable than the latter in cases of malarial disease attended with increased secretion of the mucous membranes, with a septic tendency, and with fœtid discharges; further, that it is a safer remedy in low types of fever than the cinchona salts. Roth[8] also acknowledges its antiperiodic virtues. During the late Civil War, when quinine was unobtainable, a very satisfactory substitute was had by making a tincture of willow-bark (1 to 2 of 60-per-cent. spirit), of which 30 to 60 drops were given at a dose; it was often combined with white poplar and Floridian dogwood.

It may here pertinently be remarked that, since this drug has been exploited as a remedy for rheumatism, the statement has been accepted that salicin is transformed into salicylic acid in the human economy,—that, in fact, it is but a crude form of the acid; but it need only be said that on investigation this proves to have no better basis than mere

[1] St. Louis Med. and Surg. Jour., Jan., '67.
[2] N. C. Med. Jour., Mar., '90.
[3] N. Y. Med. Jour., Aug. 2, '90.
[4] Pester Med. Chir. Presse, No. 30; La France Méd., Aug. 19, '92.
[5] Ess. Mat. Med. and Therap.
[6] Brit. For. Med. Rev., Apr., '36.
[7] Mat. Med., Pharm., and Special Therap., '89.
[8] Modern Mat. Med., '95.

surmise, and is not at all borne out by clinical experience.

Tartar Emetic. — In inflammatory, continued, and remittent fevers, says Waring,[1] whose vast experience in the tropical Indies entitles his utterances to careful consideration, this is a most valuable remedy, fulfilling two important indications, viz.: subduing the morbidly-increased action of the heart and arterial system and determining freely to the skin. In the cerebral complications of any fever, says Graves,[2] a very valuable formula which is often borne and productive of benefit when either remedy used singly either fails or is inadmissible, is tartar emetic and opium. About $^1/_2$ grain of the former and 10 drops tincture of opium should be given every two hours until copious discharges of yellow fæcal matter take place, when the patient is greatly relieved, and generally falls into a profound sleep.

In pure intermittents, Moore,[3] of the Gwalior contingent, employed tartar emetic with unequivocal success. Surgeon-Major E. Lawrie, of Hyderabad-Commission fame recently corroborated Graves, adding that in continued fever "it cuts the disease short with such certainty that it almost appears doubtful whether the lesion, instead of being specific, is not rather incidental or adventitious."[4] Ringer[5] is also very partial to antimony in fevers.

DRUGS OF THE SECOND CLASS.

Adhatoda.—The Malabar nut (*Adhatoda vasica*) is recommended by Khory[6] not alone as a substitute for cinchona in malarial fevers, but as a prophylactic.

Alum.—At one time this very common drug was held in great repute. It was especially recommended by Eltmuller, Lindt, Müller, Lange, de Mera, and Adair. Copeland[7] broadly states that the reason for which it has fallen into disrepute is that the large doses demanded caused nausea unless governed by aromatics, although even the nausea and vomiting, by reason of the revulsive effect, often prove efficacious. Certain it is that alum is a valuable remedy in malarial hæmaturia, and in the atonic hæmaturias that sometimes accompany tropical fevers.

Australian Fever-tree. — Bixby[8] declares that the Australian fever-tree bark (*Alstonia constricta*) resembles, in its action, a mixture of quinine and nux vomica; that it is an antiperiodic of the highest type, giving better satisfaction than quinine or cinchonidia. "It is a cerebro-spinal stimulant and tonic, acts positively upon the great sympathetic nerve-centres, and consequently increases positively and permanently the vital forces of the entire system. In a large majority of the cases of intermittent and remittent fevers it is a superior remedy."

Beberia is another old remedy, and one not without some measure of value. It was introduced by Maclagan,[9] who detailed 40 cases of tropical malarial fevers treated by it, with only 6 failures. Since 1843 the sulphate of the alkaloid has found extensive use in the East and West Indies, tropical America, etc., and Waring expresses the opinion, from the evidence adduced, that it is entitled to rank close to quinine; it is said to be particularly serviceable where there is cerebral disturbances. Maclagan was in

[1] Prac. Therap.
[2] Clinical Lectures, vol. i.
[3] Indian Ref. of Med. Sci., Oct., '48.
[4] Cawasjee's Vade Mecum, '91.
[5] Hand-book of Therap.
[6] Bomb. Mat. Med. and Therap.
[7] Medical Dictionary.
[8] Amer. Med. Jour. : Nat. Disp., third edition.
[9] Edinburgh Med. and Surg. Jour., vol. for '45.

the habit of giving 3 or 4 grains every two or four hours, until a total of 1 scruple would be ingested before the expected paroxysm. It was also successfully employed by Godfrey, Dorward, Anderson, Falconer, Dempster, and others. Cawasjee[1] asserts that it is both tonic and antiperiodic, and this view is corroborated by Whitla,[2] who adds, however, that it is vastly inferior to quinine and arsenic. The fact is, probably, that, while quinine was expensive, beberine sulphate furnished an excellent substitute, but the low price of the former has practically crowded its rival out of use. Goss,[3] who is an eclectic authority, declares that for several years he employed the salt with good effect, but after a time, and for some unknown reason, it did not act so well, yet, with quinine, the combination proved superior to either alone. He employs twice as much beberine as quinine. During the late Civil War, after the stock of quinine was exhausted in the South, attention was turned to the sulphate of beberia, and the results secured appear to have been fairly satisfactory.

It is important to bear in mind that *berberis* is not to be confounded with beberia, for they belong, not only to different species, but to different families and orders. Berberine sulphate is from the two forms of the latter, from which, also, the natives in the East prepare a watery extract called *rusot* that has long been esteemed a valuable febrifuge. O'Shaughnessy observed, in nearly 100 cases of malarial fever, several complicated with an affection of the spleen, that the pyrexia was checked, on an average, in three days by rusot.[4] In most instances it occasions a feeling of agreeable warmth at the epigastrium, increases appetite, promotes digestion, and acts as a very gentle, but certain, aperient. It should not be given when there is marked hepatitis or when dysentery threatens. Stevin,[5] Francis, Kirk, Hay, Tritton, Stewart, and other medical officers in India corroborate O'Shaughnessy.

Calcium phosphate, mixed with one-sixth its weight of washed sulphur, was found most efficacious in all cases and stages of well-marked intermittents by Blacklock, of the Madras Medical Establishment.[7] He was in the habit of preceding the remedy by a purgative, then administering 2 drachms daily in treacle. It is more than probable that the good effects here were due to the alterative and aperient action induced, although Cawasjee[8] insists that it is not only beneficial in all low forms of fever, but also a specific for malarial diarrhœas.

Calomel.—In both the malarias of the tropics and subtropics calomel always has, and probably always will, figure largely. It was formerly held as a curative agent, but its use in this respect has been well nigh abandoned because of the supposed more specific action of quinine. Waring[9] declares that the mercury salt, given in full dose, 2 to 3 scruples, will frequently abort any onset of malarial character.

Camphor.—A remedy of great power that has almost been lost sight of during recent years is camphor. Waring[10] and a host of German and Anglo-Indian authorities assert that in *all* fevers, no matter what their original character,

[1] Practical Vade Mecum.
[2] Mat. Med. and Therap.
[3] Mat. Med., Pharm., and Special Therapeutics, '89.
[4] Bengal Dispensatory.
[5] Ind. Ann. of Med. Sci., Apr., '56.
[6] *Ibid.*, vol. iii.
[7] Report of Madras Med. Board, '90.
[8] Prac. Vade Mecum.
[9] Practical Therapeutics.
[10] *Ibid.*

when they assume a low type, this drug proves a remedy of great value. Copland,[1] after quoting a host of German writers in favor of the drug, states that, in the stage of excitement attended by vital prostration, the dose, and the medicines which should be associated with it, should have reference to the state of the vital power, to the mildness or severity of the diseases, and to the nature of the prominent affection or complication.

Carbozoate of ammonia, or picrate of ammonium, has also received a share of attention during recent years. Clark[2] claims to have treated no less than 10,000 cases of malarial disease thereby, and to have kept a record of half the number. He chronicles but 9 failures in the 5000. He adds "all forms of malarial disease yield promptly" and that it is "a perfect and efficient substitute for quinine"; further, it has the advantage of being inexpensive, requiring but small dosage ($^1/_8$ to $^1/_2$ grain four or five times daily), and does not produce any unpleasant effects, such as headache, tinnitus, deafness, digestive disorders, nausea, etc. Popoff[3] employed it in 42 cases, 37 of recent character, and all recovered, the paroxysms ceasing, on an average, in four days. In 3 of 5 inveterate cases the remedy failed. Bose[4] tried picrate of ammonium in four cases with "wonderful results."

Castor is another remedy greatly neglected, but of undoubted power and value in fevers. It has long, in conjunction with myrrh, been considered as a specific in malarial fevers, but its reputation has passed away, owing to the substituting of the American—which is nearly inert—for Russian castor. Sennertus[5] praises it above all antiperiodics.

Cerevisiæ Fermentum.—In malarial pyrexias of low type—bilious-remittent, pseudocontinued, and even true continued fever—yeast, or "barm," the scum or residuum which forms during the process of fermentation of beer, has been employed on many occasions with signal benefit. Stoker,[6] after a trial of its powers for upward of thirty years, speaks highly of its efficacy. Waring[7] declares that it is generally easily taken, either alone or with any remedy that it may be advisable to join with it; and in the worst form of fever, when it is most needed, it not only is seldom rejected by the stomach, but the patient often expresses a liking for it. Stoker[8] found that it acts as a stimulant, antiseptic, tonic, antiperiodic, and often as a gentle laxative; the latter action, if undesired, can be controlled by adding a few drops of laudanum. In the most obstinate cases of tympanitic distension, enemata of yeast and asafœtida are almost invariably efficacious. Tweedie[9] considers yeast deserving of far more attention than has ever been given it. It is also strongly advocated by Lamprey,[10] who declares that he cannot speak too highly of its properties: an encomium that is echoed by the late Hugh Bennett.

Charcoal.—Calagus[11] first called attention to the efficacy of wood-charcoal when given in 1- to 3-scruple doses; he believed it fully equal to cinchona in malarial fevers. Calvert,[12] who was physician to the British forces at Palermo, also employed it with success, and intimates that it is especially useful

[1] Medical Dictionary.
[2] Wien. med. Woch., '88.
[3] Brit. Med. Jour., Oct. 27, '94.
[4] Ind. Med. Rec., Mar. 16, '96.
[5] De Febritus, lib. ii, cap. 20.
[6] On Fevers.
[7] Prac. Therap.
[8] *Op. cit.*
[9] Cyc. Prac. Med., vol. ii.
[10] Dub. Quar. Jour., Aug., '79.
[11] London Med. Rep., vol. iii.
[12] Edinburgh Med. and Surg. Jour., vol. x.

when marked disturbance of the digestive organs exist, such as flatulence, diarrhœa, etc. The remedy, from a rational stand-point, would certainly seem worthy of further trial.

Corn.—Pruitt, of Arkansas,[1] calls attention to the efficacy of a distilled extract of common Indian corn. After the corn has been gathered, well dried, and freed from stems and mildew, 4 pounds of husks with 16 gallons of water are placed in a still having a capacity of 20 gallons. Ten gallons of the distillate are drawn off, which is clear, transparent, and in odor and taste resembles boiled green corn. For purposes of preservation, 8 drachms of alcohol and 4 of glycerin are added to each 15 ounces of distillate. The dose is 1 to 2 teaspoonfuls every two or three hours. The medicament has no especial value in cases of acute malarial infection, but appears to act specifically in chronic forms. The effects of the administration are speedily observed: the temperature soon declines, the irritability of the stomach subsides, the action of liver and kidneys is favorably influenced, and the enlargement of the spleen diminished. In many cases a mild diuretic effect may be observed.

Garrya.—The California fever-bush (*Garrya Fremonti*) Smith[2] considers as one of the most effective antiperiodics. Living, as he claims he does, in the South-Arkansas-River bottom, where, in his opinion, the fevers are of a malignancy equal to any in the world, he has found them terminate quicker under garrya than any other remedy. Usually the fever terminates in twelve hours after the drug is begun, and with profuse perspiration and opening of all the emunctories.

Gentian.—Gentian is another drug at one time lauded, doubtless because of its bitterness. Chavasse,[3] of the French navy, asserts that it is a complete prophylactic in the malarial fevers of Guiana. He declares that it neutralizes the miasmatic poison if taken before any pathological manifestation of the fevers had developed. He gave the tincture in brandy, twice daily, and considers that the addition of the spirit is important inasmuch as it excites the energies of the nervous system "so as to make it accessible to the operation of the drug." Certainly further light on this particular point is desirable.

Gulancha (*Cocculus Cordifolius*).—This is greatly esteemed by Hindoo practitioners, and many English officers—such as Stewart, Campbell, Hardie, Piddington, and others—claim to have employed it with success. Waring,[4] after trying in twenty cases of malaria such as occur in the Tenasserim provinces, and in much larger doses than ordinarily advised, found that while it prevented the accession of the cold stage in every case, it did not appear to diminish the severity or prevent the return of the hot stage. This action is so peculiar that he suggests further trial. Cawasjee[5] speaks well of it as an antiperiodic, alterative, tonic, and diuretic; hence—particularly as it is common to tropical America, and has been successfully employed as a tonic in the United States—it would seem worthy of further attention.

Iron.—The sulphate salt is certainly of value in intermittents, but more often in combination than when employed singly. Marc[10] employed it with such

[1] Chicago Med. Times, June, '93.
[2] Therap. Gaz., '80.
[3] L'Union Méd., Jan. 1, '60.
[4] Prac. Therap.
[5] Prac. Vade Mecum.
[6] Sédillot's Jour. Gén. de Méd., vols. xxxiv, xxxvi; Med.-Chir. Rev., Oct., '33.

great success that Corvisart was appointed by the Academy of Medicine to make inquiry thereon; and, though he reported most favorably, from some unexplained cause the drug soon fell into disuse. Waring[1] employed iron in nearly 200 cases in the Tenasserim provinces of Burmah, and declares that in more than two-thirds of the number complete success attended the use of the drug: evidence that is too strong to be easily controverted. He remarks that it should not be used when there is much gastric irritability or where the patient is stout and plethoric with a determination of blood to the head; further that the bowels should be carefully regulated, and on no account should acids or acidulous fruits be allowed,—on these last two points he lays great stress,—adding that, properly employed, it is a remedy of great power. He gave from 8 to 10 grains daily, often with a little extract of henbane, in pill form, or in solution with infusion of quassia. Twenty grains daily may be ingested if required. [The writer has employed ferrous sulphate for many years with pronounced success.]

Labarraque's Solution.—The solution of chlorinated soda has long been known for its favorable effects in fevers of a low type, though modern medical fashion is wont to ignore it except as an antiseptic or disinfectant. The history of the preparation, carefully scanned, will be convincing that it is deserving of careful consideration as regards all forms of fever that exhibit any tendency to typhoid. The memoir of Lalesque and Gouzée[2] to the Paris Academy of Sciences as to its value in malarial fevers was so strong that a Committee of Investigation was appointed, who reported: "The hypochlorite of soda actually possesses febrifuge properties, but does not produce the certain and energetic effects of quinine, and consequently cannot replace the latter in the more severe forms of fever. But it is not irritant, and recourse may be had to it in milder cases with advantage, especially as it exercises a favorable influence over engorgements of the spleen. The ordinary dose is from 10 to 30 minims in 1 to 2 ounces of water."

The Olive-tree.—In Italy and southern Europe the leaves and resin of the common olive are popular remedies for fevers of malarial origin. They may be employed separately or together. Giadoron[3] reports several cases thus successfully treated, using the resin in 2-drachm doses six times daily (every two hours) during the intermission. The leaves were employed equally as often in doses of from 1 to 3 drachms. Hanbury[4] speaks highly of the febrifugal properties of the olive.

Opium is a valuable adjunct in the treatment of malarial fevers, though not often employed nowadays as a direct remedy. Its use in this class of diseases dates from before the time of Galen; it subsequently lapsed, only to be reintroduced in modern times by Trotter,[5] and to be taken up and warmly advocated by Lind.[6] The latter declares that, if given in the intermissions, it has not the least effect either in preventing or mitigating the paroxysm; that when given in the cold stage it sometimes removes it; that when administered half an hour after the commencement of the hot stage it generally affords immediate relief. When given in the latter manner it shortens and abates the fit with more certainty

[1] Prac. Therap.
[2] Revue Méd., Feb., '36.
[3] Ann. Univ. di Med., June, '61.
[4] Pharm Jour., vol. xiii.
[5] Med. Naut.
[6] Fevers and Infections.

than an ounce of cinchona; it generally gives sensible relief to the head, takes off the burning heat of fever, and occasions a profuse sweat; it often produces a soft, refreshing sleep, from which the patient awakes bathed in sweat and, in great measure, free from all complaints. When thus given it certainly renders the patient less prone to liver disease, dropsy, etc. Waring remarks[1] that, while he cannot speak of the efficacy of the drug in the hot stage, he has often given 40 minims of laudanum at the commencement or even during the presence of the cold stage, which operated like a charm in cutting it short; and, although it did not appear to shorten the subsequent hot stage, it appeared in many instances to mitigate its severity. So fully aware of the foregoing were the soldiers under Wellington, during the Peninsular War, that, as Joseph Brown states,[2] at the first appearance of the cold stage they applied in most instances for an "ague-draught," which consisted of 40 minims of tincture of opium and 60 minims of ether. (These doses are excessive—for up-to-date human beings.)

Picric, or carbazotic, acid for a time received a measure of confidence in the treatment of intermittent, remittent, bilious-remittent, pseudocontinued, and other tropical fevers, but failed to justify the encomiums of its friends. In continued fever complicated with subacute peritonitis and tympanitis it has sometimes seemed to serve as well as quinine; but the uncertainty of its action gives ground for a suspicion that its supposed merits were matters merely of coincidence. The experiments of Erb seem conclusively negative,[3] though Clark[4] affirms that he has treated 10,000 malarial cases with it, and with such good results that he has entirely abandoned the use of cinchona alkaloids. He gives $^1/_8$ to $^1/_2$ grain four times daily in pill form, $^1/_3$ grain being the average dose.

Pepper.—The dried unripe berries of the ordinary black pepper of commerce (*Piper nigrum*), bruised and macerated in rum (or other spirit) and water, has long constituted a popular remedy in the East and West Indies for the fevers peculiar to these regions; and it is also held in high repute by many German practitioners. Doubtless the more mild and uncomplicated cases will, as Waring[5] believes, yield thereto, especially in the tropics, or even in the temperate zone during continued high temperature (see remarks under CAPSICUM, *ante*). They should be given immediately before the expected paroxysm.

Pepper-corn.—What has been said regarding black pepper is here equally applicable.

Piperine, which is obtained from black pepper, has been credited with febrifugal and antiperiodic properties, but the majority of observers seem skeptical. Hartle,[6] of Trinidad; Meli and Gordini,[7] of Italy; and Blom[8] bear witness to an efficacy that is denied by Soubeiran[9] and O'Shaughnessy.[10] Waring[11] remarks that these differences may be partially explained, perhaps, by the different degrees of purity of the remedy. Hartle always began, as soon as the sweating stage was established, by giving 3 grains every

[1] Prac. Therap.
[2] Cyc. Prac. Med., vol. ii.
[3] Deuts. Klinik, No. 40, '55; Med. Times and Gaz., Sept., '62; New Remedies, '73; Gaz. des Hôp., xiv, 116; Ohio Med. Recorder, '77.
[4] Lancet, London, vol. i, '87.
[5] Prac. Therap.
[6] Edinburgh Med. and Surg. Jour., Jan., '41.
[7] Revue Méd., t. iii.
[8] Edinburgh Med. and Surg. Jour., Oct. 1, '37.
[9] Traite de Pharm., vol. ii.
[10] Bengal Disp.
[11] Prac. Therap.

hour until 18 grains had been taken, and on the following day, when the intermission was complete, he gave the same quantity every three hours. In "*every* case," he declares, "it succeeded in checking the paroxysm."

Phloridzina. — There is a neutral bitter principle which is found in the bark of the trunk and root of apple-, pear-, cherry-, and plum- trees known as phloridzina; it is crystallizable, sparingly soluble in water, readily so in alcohol, alkaline solution, and ammonia; there is also a derivative known as *phloretin.*

Phloridzina was discovered by de Konick in 1835, and he and many able men, such as Van Mons, Mathysen, and Lebaudy[1] bore strong testimony as to its most superior tonic and antiperiodic properties. Only a single unfavorable report was ever given against it, and that scarce half-hearted, by Leonhard,[2] but it practically passed out of sight until resurrected by de Ricci,[3] who recommended a trial of it in every case where quinine is not easily tolerated. He affirms that it is much more easily taken than either cinchona, quinine, or salicin, the bitter being of a pleasant kind, changing into a sweetish taste, with the flavor of apple. No doubt this is a valuable remedy, though it has again practically passed from view; but one fact exists that appears not to be known, viz.: that, persisted in too long, or given in too large doses, it induces glycosuria, which, however, disappears as soon as the remedy is withdrawn. Merck's is perhaps the only house that now markets the product and also its derivative *phloretin.*

Potassium Permanganate.—Our correspondent, Dr. Levi, of the Virgin Islands,[4] has employed this salt with very successful results, in doses of $^1/_2$ to 1 grain three times daily, dissolved in water; he asserts that this method is especially effectual in the chronic forms of malaria. Considering how quickly the salt parts with its oxygen when introduced into the circulation, its subcutaneous use would seem worthy of consideration.

Quassia.—At present this well-known bitter is, for the most part, held to be a simple tonic and stomachic, yet it first came into repute as a successful remedy in the treatment of the severe (malarious) fevers of Surinam, and to-day its reputation in the West Indies is little, if at all, dimmed. Thomas[5] declares that during his residence in the latter region he met with many cases of malarial fever which, after resisting the powers of cinchona, gave way to the use of quassia. "Indeed," he adds, "so sovereign a remedy was this found, and so easy was it to be obtained, that it was pretty generally substituted by all practitioners." He advises that it be given in the form of an infusion 1 to 32. The fact will be recalled that this was a favorite remedy of the famous Lettsom in low fevers, and, according to his own account, a most successful one. The truth is, however, that most of the quassia obtainable nowadays is spurious, which may have something to do with its present comparative lack of repute as a febrifuge and antiperiodic.

Quinine-flower (*Sabbatia Elliotti*) may prove of considerable value in an emergency, especially as it grows wild in the southeastern United States. Bigelow[6] asserts that all parts of the plant are

[1] Ann. de Thérap., '43; Bull. Méd. Belg., Oct., '35, and May, '36; and Jour. des Connais. Méd., '42.
[2] Ency. des Scien. Méd., May, '38.
[3] Dub. Quar. Jour. of Med. Sci., Aug., '62.
[4] Ann. Univ. Med. Sci., '88.
[5] Prac. of Physic.
[6] New Prep., '79.

antiperiodic, and that he treated seven cases of intermittent with it successfully. His views are corroborated by Palmer.[1]

An allied species, also of Southern origin, the *Sabbatia campestris*, is equally lauded by Newton,[2] Padeir,[3] Sparr,[3] and Hall.[4]

Sodium chloride, common salt, has not escaped the list of remedies. Willemin, at one time Sanitary Physician in the East, in a report to the Paris Board of Trade[5] stated that at Damascus large doses of table-salt are employed in intermittent and other malarious fevers, and that the remedy is successful in 6 of every 7 cases; two to four doses of $^1/_2$ ounce each, dissolved in water, are usually sufficient. Piorry[6] is equally emphatic, declaring that from $^1/_2$ to 1 ounce at a dose not only controls the fever, but has a tendency to diminish the enlargement of the spleen. Both the foregoing statements are corroborated by Hutchinson,[7] who, in 22 cases, prescribed from 8 to 12 drachms during a pyrexia; he asserts that it is a good, and obviously a cheap, substitute for the cinchona alkaloids and their salts, though inferior to the latter in power.

Sodium Sulphites. — Little[8] employs both hyposulphite and also bisulphate of soda rather than quinine, and his results appear to have been eminently satisfactory.

Soymida febrifuga is an East-Indian bark that has gained a reputation as an excellent substitute for cinchona,[9] but fell into desuetude when the price of the latter was brought within reasonable limits. While such East-Indian practitioners as Roxburgh, Duncan, and Breton—as well as many others of lesser note—thought well of it, O'Shaughnessy[10] considered it of very questionable efficacy.

Strychnos Nux Vomica.—The bark of this tree, as well as its nuts,—the latter the source of ordinary nux vomica,—undoubtedly possesses considerable febrifugal power, but Waring[11] regards its use inadmissible when there is either congestion of liver or spleen or any cerebral complications.

Strychnine.—Nash[12] reports 37 cases of malarial fever treated by strychnine in the Regimental Hospital, Gaol, and Civil Dispensary, Mercara, India, with a percentage of 75 in favor of strychnine over quinine in the period of recovery.

Sunflower.—Filatoff[13] warmly praises the efficacy of a tincture of sunflower-stems made with corn-brandy (1 to 8) in tablespoonful doses three times daily. Many Russian physicians uphold this treatment, and it has acquired a definite *status* in many parts of southern Russia and in Siberia.

Sweet-flag. — *Acorus calamus* was formerly held in high estimation, and it is still a popular remedy in southern Europe and tropical Asia. Thompson[14] declares that it often succeeds when quinine fails, and the late Professor Royle[15] states that he frequently employed it in conjunction with chiretta and bonduc-nut with great success.

Synthetics.—ANTIPYRINE; ACETANILID.—Latterly, in some quarters, the

[1] Jour. Pharm., '79.
[2] Ther. Gaz., '81.
[3] *Ibid.*, '82.
[4] *Ibid.*, '81.
[5] Waring's Prac. Therap.
[6] Ann. de Méd. et Chir., vol. i, '53.
[7] N. Y. Med. Jour., Mar., '54.
[8] Amer. Jour. Med. Sci., Jan., '70.
[9] Waring's Prac. Therap.
[10] Bengal Disp.
[11] Prac. Therap.
[12] Lancet, Lond., Mar. 14, '78.
[13] Meditz. Oboz., Nov. 15, '93.
[14] Prac. Therap.
[15] Materia Medica.

treatment of malarial disorders by means of the synthetics, and more particularly the synthetic antipyretics, had been loudly advocated. Pampoukis, of Athens,[1] states that antipyrine and acetanilid have been extensively used by Greek physicians in all malarial disorders with satisfactory results in shortening the duration and mitigating the intensity of the febrile stage. He personally prefers antipyrine. On the other hand, Harley,[2] who appears to have employed the coal-tar antipyretics in a number of cases, regards acetanilid as the superior drug, because, as he asserts, of its greater power in reducing temperature and the absence of after-effects.

PHENOCOLL.—Cucco[3] employed phenocoll hydrochlorate, another synthetic remedy, in 84 cases of malarial fever, giving the drug a few hours after the anticipated attack; in 52 cases the result was satisfactory; in 21 doubtful; in 4 an absolute failure; and in the remainder no definite conclusion could be reached. Vincenzo[4] found the drug useful in 5 cases of grave character that would not yield to quinine. Of 28 cases thus treated by Cerna,[5] 21 were successful; in 7 the drug failed, though temperature was reduced, 3 of which yielded to quinine; the other 4, in which quinine also failed, yielded to arsenic. Bernarda[6] treated 20 cases, but also added quinine, arsenic, and iron; he had 3 failures. Feletti[7] tried it in several cases, but found that the drug had only a transitory effect. Olio[8] states that phenocoll does not appear to have any potent antipyretic properties as regards fever in general, but considers it as effective in the malarial state and succeeds in a certain number of cases where quinine absolutely fails, which he regards of importance if only from the fact that difficulty might arise in obtaining a supply of quinine equal to the demand, while phenocoll is producible in any quantity. Quirogne,[9] from experiments made in Algiers, concludes that phenocoll is no substitute for quinine in malarial disorders, but may be made a valuable adjunct thereto by reason of its analgesic properties; yet even very moderate doses are apt to cause symptoms of collapse.

METHYLENE-BLUE deserves, apparently, to be placed in much the same category as phenocoll. Guttman[10] believes that the remedy prevents recurrence of paroxysm and exercises a toxic influence upon the malarial parasite; but, to insure the destruction of the latter, it should be given for four weeks after apparent convalescence. Mya[11] found that, while it exerted some influence on the course of the fever, in the majority of instances the effect was but slight or transient; he further notes that the drug is objectionable on account of the severe gastric pain, pyrosis, and strangury to which it gives rise, and that it likewise has a tendency to diminish excretion by the kidneys. Porenski and Blatters, of Cracow,[12] also observed unpleasant symptoms, such as headache, anorexia, and vomiting; but they consider that it may, in some cases, be as useful as quinine; it should, however, be reserved for those wherein the latter drug proves inefficacious. More recently Röttger and Riel,[13] believing that the doses employed by other ob-

[1] Le Prog. Méd., Jan. 9, '88.
[2] Ind. Med. Gaz., June, '88.
[3] Therap. Monat., Apr., '93.
[4] Münch. med. Woch., Nov. 29, '92.
[5] Therap. Gaz., Dec., '93.
[6] Gaz. deg. Osp., Dec. 7, '93.
[7] Riforma Med., Apr. 11, '94.
[8] Gaz. deg. Osp., Jan. 14, '93.
[9] La Sem. Méd., Nov. 17, '97.
[10] Münch. med. Woch., Dec. 20, '92.
[11] Lo Sperim., Dec. 31, '91.
[12] Ther. Monat., Jan., '73.
[13] Deut. med. Woch., Apr. 9, '96.

servers were too large, experimented with small doses, frequently ingested (1 to 1 1/2 grains, eight times daily), and reports the effect as most striking in producing rapid cessation of the attack in one case; in succeeding ones it only succeeded in modifying. There was no noteworthy modification produced as regards the *plasmodium malariæ*, such as Guttman (see *ante*) imagined he had discovered. Finally, Laveran[1] made a study of the blood of pigeons treated with injections of methylene-blue, and failed to find any changes in the hæmatozoa, which are closely allied to those found in man; and a study of two cases of malaria along the same lines was equally negative.

Tannin.—Leriche[2] speaks highly of tannin in doses of from 20 to 30 grains, according to the intensity of the disease, when taken three hours before the paroxysm. Two or three doses, it is claimed, are usually sufficient to effect a cure, and it may be necessary to exhibit 60 or even 75 grains at once. The fact may be recalled that galls are a favorite Hindoo remedy for intermittents, and possessed of some efficacy, doubtless, though slight. It is important to note, however, all things being equal, that it requires a remedy of twice the strength of that employed by the Hindoo to procure a like effect upon the Caucasian. Unfortunately, the medical profession have become so accustomed to regard tannin as an astringent purely, that its other excellent remedial qualities have been entirely lost sight of.

Turpentine is another old-time remedy for low, continued, and inflammatory fevers of all types, the utility of which, in tropical remittents and intermittents, but few seem to realize. Shapter[3] asserts that in the third or last stage of tropical remittent, in doses of 30 minims, it is one of the most safe and useful remedies that can be employed, and that it almost immediately controls the character of the symptoms and changes entirely the character of the alvine secretions. Ward[4] found it of great advantage in the management of the malarial fevers of Ceylon in doses of from 30 to 60 minims, given with sufficient castor-oil to act as a cathartic, and at the commencement of the cold stage; this he repeated before each succeeding cold stage, and frequently found that no other treatment was required.

Zinc Oxide.—In the fevers of Barbadoes Hendy[5] found oxide of zinc, in doses of 2 to 5 grains, effectual when cinchona and other remedies had failed. Sir Gilbert Blanc[6] bears equally-strong testimony regarding the drug.

Zinc Sulphate.—This salt has also been employed with success. The late Joseph Brown[7] was accustomed to use it in pill form with ginger and conserve, giving two pills, each containing 3 grains of zinc sulphate, thrice daily during the intermission, gradually increasing as the stomach would bear it. He held zinc sulphate as second in value only to arsenic as an antiperiodic. McGrigor[8] gave it to the soldiers in Spain and Portugal during the Peninsular War, to the extent of 30 grains daily, with great success.

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[1] La Sem. Méd., Feb. 3, '93.
[2] Jour. dé Med. et de Chir., Dec., '61.
[3] Lib. of Med., vol. i.
[4] Med. Times, Sept. 15, '60.
[5] Waring's Prac. Therap.
[6] Trans. Med.-Chir. Soc., vol. iii.
[7] Lancet, Lond., Oct. 17, '63.
[8] Waring's Prac. Therap.

Insolation (Sun-stroke; Heat-stroke; Thermic Fever; Siriasis).

Symptoms.—De Santi,[1] who has had considerable experience in the treatment of sun-stroke in tropical and malarial countries, recognizes two distinct forms: the one, occurring in soldiers who have not had much training in marching and who soon become fatigued; the other, occurring in soldiers who have already suffered from malaria. The first variety is the one that we shall have the most cause to fear in the first portion of the campaign.

In the first form, the man, who has so far marched well, becomes silent, unbuttons his tunic, and, if asked, complains of violent headache and oppression; but he continues his march up to the moment when he becomes pale and falls, with convulsive movements, as if in attack of epilepsy. The teeth are firmly closed, the insensibility is absolute, the respiration difficult, the pulse small and irregular, and he often passes water in his trousers; what attracts special attention is the waxy pallor of the face.

The asphyxial attacks come on usually in young soldiers inexperienced in marching, with equipment badly distributed, or clothing too heavy or too tight, or perhaps the subject is delicate, or is already fatigued, or has drank too much the night before. The weather is heavy, and the air is hot and loaded with dust. The patient moans, he streams with sweat, he drags in the rear, and if he continues his march he becomes paler and paler, while his lips become cyanozed; the jugular and temporal veins swell; the eyes become injected; the respirations shallow and quick, until the sufferer falls gently to the ground. He generally does not entirely lose consciousness, and, when he is laid down and relieved of everything which interferes with respiration, breathes deeply and quickly becomes himself again. Sometimes, however, on coming around, various nervous symptoms, usually not important, supervene.

The malarial form generally occurs in old soldiers who have long struggled with paludism. The weather is very hot; the man marches ill on starting, but becomes more animated as he goes along. His face is red; he does not seem to feel the fatigue, but is thirsty; suddenly, as if struck down by a club, he falls face downward in a state of absolute coma. Here, generally, the face is turgid, but sometimes it is pale. This state may last for hours, twenty-four or thirty-six, and may terminate in death without recovery of consciousness. Generally, by reducing the temperature, by artificial respiration, by flagellation, and especially by the subcutaneous injection of ether, the coma passes away in half an hour or an hour, but it is apt to return.

Pathology.—The pathology of this malady has always been, and yet is, a matter of speculation. In a paper based upon upward of eight hundred cases Lambert[2] discusses the latest investigations and most recent views of the subject. The theory that the malady is an autointoxication is by no means new, but is not yet susceptible of definite proof. Gieson believes that the ganglionic cells of the spinal cord and encephalon un-

[1] Archives Gén. de Méd.; Brit. Med. Jour., July 18, '96.
[2] Med. Rec., July 4, '97.

dergo some degenerative change due to the operation of a toxic substance. The latter seems to possess a degree of possibility, in so far as is evidenced by the fact that the blood-serum of those bled during an attack of sun-stroke, even if injected in small quantity into rabbits, will cause the death of these creatures within an hour.

What seems to have been established is that heat alone is not sufficient to explain all the clinical and pathological observations in these cases. The prodromal symptoms of sun-stroke are those of acute functional disturbance, while the later symptoms, much more serious, point to grave changes in the blood and in all the nerve-centres, especially those of the latter which control the thermic mechanism of the body.

Martin[1] specifies three types of sun-stroke also: the cerebro-spinal, characterized by symptoms of intense congestion—by injection of the face and conjunctiva, by stertor, coma, and convulsions; the syncopal, or cardiac, type, made manifest by pallor of face and profuse perspiration, death taking place by arrest of the heart; and the pulmonary form, in which, in addition to some of the symptoms pertaining to the other two there are anxiety, dyspnœa, and asphyxia. He further adds that sun-stroke usually arises under conditions of mental or physical overactivity in conjunction with undue exposure to heat and a suppression of the secretions, the disease being dependent upon retention, in the system, of toxic products of retrograde metamorphosis.

De Santi[2] looks upon insolation as in all cases characterized, from a pathological point of view, by arrest of the heart, but as dependent on different causes. These may be classified as arising from intoxication by the products of muscular effort; from asphyxia; from a malarial infection called into activity by fatigue or heat. In the first form, that of intoxication by the products of muscular exertion, the victims are chiefly among soldiers unaccustomed to the fatigue of a march. The attacks occur when the temperature is high and the air is calm and humid; so that the cutaneous evaporation is small, and generally in the second part of the march.

Etiology.—Sambon,[3] of Rome, insists that the malady is due to infection pure and simple, and consequently possesses such elements of specificity as to entitle it to the term first bestowed thereon of siriasis; but he differentiates this "sun-stroke" from the mere syncope of heat-exhaustion. The latter may be brought about by excessive exertion under unfavorable conditions; while siriasis is due to excessive heat and occurs during the hottest season of the year. He calls attention to the fact that siriasis exhibits remarkable endemic characters, in that it is extremely prevalent in one locality, in another is totally absent, though the region may be quite adjacent and under precisely similar climatic influences; again, its ravages in different years vary immensely and quite irrespective of heat. Though Colin and de Santi (see *ante*) have considered siriasis as a form of malaria, Chevers and other Anglo-Indian surgeons long before remarked on the probability of sudden attacks of the disease being caused by "malaria in a concentrated form."

Phillips[4] considers that meteorological conditions predispose to sun-stroke,

[1] La Sem Méd., Sept. 16, '91.
[2] Archives Gén. de Méd.; Brit. Med. Jour., July 18, '96.
[3] Brit. Med. Jour., March 19,'98.
[4] Med. Rec., June 12, '97.

and these involve high temperature, relative humidity, wind, and climatological characteristics, as well as the direct rays of the sun. He thinks that the attack is no more dependent on high temperature and direct insolation than it is on low relative humidity. The degree of temperature precipitating sunstroke is a function of the particular climate, and not fixed or definite for all locations.

Treatment.—Martin[1] antagonizes asphyxia by subcutaneous injections of from 15 to 30 minims of ether every hour, conjoined with artificial respiration. In the congestive type cold affusions should be made to the face and head, and rubefaction of the extremities induced. Subsequently, to prevent the recurrence of congestion and asphyxia, to re-establish the functions of the natural emunctories, and to favor the elimination of noxious matters, subcutaneous injections of cocaine (2 to 4 grains), with or without ether, three or four times in twenty-four hours.

Packard[2] as the result of treatment of thirty-one cases suggests the following: Put patient in the shade where there is as free circulation of air as possible, strip him, and, if the temperature is above 106°, apply ice to body until it falls to 104°, then dry and put to bed with an ice-cap to head. If convulsions occur at this time, he employs morphine; and, if circulation and respiration do not improve with the fall of temperature, bleeding may be resorted to.

Later, the same writer[3] advocates, in addition to the foregoing measures, hypodermoclysis, and cites a case that seemed to have been fairly snatched from the jaws of death by the method.

Lewis[4] suggests that a watery solution of antipyrine (1 to 2) be carried in the pocket for instant use when there is danger of encountering cases of sunstroke, and as soon as the patient is seen 20 minims should be administered hypodermically.

Gannett[5] and Koerfer[6] alike emphasize the value of chloroform to control the convulsions. In a case treated by the latter death seemed imminent, and the inhalation of the drug was begun while preparations for a cold bath were being made, and the result was immediate improvement of respiration, renewed cardiac activity, and improved pulse. Koerfer believes the utility of chloroform is derived from its power to diminish the irritability of the cardiac ganglia, thereby preventing the muscular fatigue upon which fatal heart-failure depends; it also acts as a sedative to the general nervous system, controlling the convulsive tendency, thus lessening heat-production, probably also facilitating heat-dissipation, and permitting the employment of other therapeutic measures directed to the reduction of temperature and supplying water to replace that lost in consequence of the pyrexia. If there is much respiratory disturbance, manifested by expiratory dyspnœa, Gannett advocates, where possible, the administration of oxygen by inhalation.

Hume[7] reports dyspnœa and depression of the heart's action arising from partial sun-stroke, in an officer who had been marching all day in the hot Indian sun, and which he attributed to direct vagic inhibition. Three grains of ipecac relieved the patient and put him to sleep.

Atkey,[8] of the P. and O. Service, em-

[1] La Sem. Méd., Sept. 16, '91.
[2] Amer. Jour. Med. Sci., June, '88.
[3] Med. News, Aug. 22, '96.
[4] Phila. Med. and Surg. Reporter, July, '88.
[5] Boston Med. and Surg. Jour., Apr. 20, '93.
[6] Deut. med. Woch., July 13, '93.
[7] Lancet, Lond., Apr. 20, '89.
[8] Lancet, Lond., Apr. 4, '96.

ploys iced baths, ice to head, and brandy until there is a return of consciousness, then gives calomel.

Sickel,[1] Royal Navy, employs strychnine hypodermically, ice-water baths or ice-pack, enema to relieve the bowels, chloral, etc.

Smyth,[2] of the Royal Mail Steamship Line, also resorts to ice-baths and the ice-cap, but employs antipyrine to keep down temperature.

O'Dwyer[3] employs the ice-pack and ice-cap, and dashes ice-water with force from dippers at distances of from eight to ten feet for thirty or forty minutes if necessary; but he finds the most efficacious stimulant, though it can be applied only one or two minutes at a time, a fine stream of ice-water poured from an elevation upon the forehead. Finally most patients are given subcutaneously 40 minims of digitalis at a dose, unless the sufferer is very plethoric, in which case venesection is practiced, and the fox-glove given later on in smaller doses.

De Santi,[4] bearing in mind his differentiation of the varieties of sun-stroke (see *ante*), in the form he deems to be due from intoxication by the products of muscular effort, lowers the temperature by cold applications, sustains the heart by artificial respiration, and combats coma by the subcutaneous injection of ether. In what he terms the asphyxial form, little is needed but rest, pure air, and the recumbent posture. The malarial form includes subcutaneous injections of quinine, but the first indication is restoration of cardiac action by artificial respiration and ether hypodermically; he remarks that so important is the latter means considered in Germany that during the summer marches every military surgeon is ordered to carry upon his person a Pravaz syringe and a bottle of ether in order to be always ready for cases of sun-stroke.

Prophylaxis. — Kinnear[5] thinks that all those predisposed to heat-exhaustion will find safety in the employment, two or three times daily, of cold to the spine, or of a double-columned hot-water bag: a suggestion that seems worthy of consideration.

The colonial governments of Australia asked the medical board to issue appropriate instructions as to prophylaxis from sun-stroke. The board is stated to have declared[6] that, of all predisposing causes, undue indulgence in intoxicating liquor is the most common and the most dangerous. Further, that during the attack it is dangerous to employ intoxicants as a remedy. Most people will cordially indorse this opinion. In many cases sun-stroke has practically been alcohol-stroke, and in other cases an injudicious resort to alcohol therapeutically has endangered the sufferer's life. Even by the abstinent, under extreme heat-conditions, it is essential that such common-sense precautions as the wearing of appropriate clothing, of light, non-radiating head-gear, and moderation of exertion should be adopted. Undoubtedly, *cæteris paribus*, the strictly abstinent have the least risk of heat-apoplexy.

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[1] Brit. Med. Jour., Sept. 19, '96.
[2] Brit. Med. Jour., Jan. 9, '97.
[3] N. Y. Med. Jour., June 5, '97.
[4] Archiv. Gen. de Méd.; Brit. Med. Jour., July 18, '96.
[5] Med. Rec., Aug. 21, '97.
[6] Brit. Med. Jour., June 20, '96.

Scalds and Burns.

When troops are not in action burns are probably not more frequent among them than in civil life. On shipboard, however, the engineering department frequently contributes a sufferer, the majority of accidents in the engine-room involving the escape of steam or contact with heated metal. In war-times the chances in this particular are obviously greatly increased, the continued and sometimes excessive use of the engines increasing the likelihood of accidents while in action; besides these agencies, the fact that modern war-vessels are constructed of iron and steel adds considerable opportunity for injuries of this kind. The Battle of Yalu showed the effect of the blows received from projectiles upon armor; the heat developed by the impact was such as to cause the plates to become destructive to the tissues when touched. Capt. McGiffin of the *Chen Yuen* was thus severely injured. Aside from this are the many features incident upon rapid and continued use of weapons, contact with metallic fragments, etc. The casualities of this kind on board the Japanese ships were more numerous than any other kind among them.

Text-books usually contain but little information upon the practical aspect of the question. It is, therefore, deemed advisable to insert a description of the effects produced upon the tissues by scalds and burns furnished by a member of our editorial staff, Dr. J. Abbott Cantrell, and to give a list of the most effective methods of treatment at present resorted to.

Symptoms.—Local Effects.—"In burns of the first degree the appearances produced are superficial. There will be observed a distinct hyperæmia, with redness of varying intensity from the slightest blush up to a pinkish red or brownish red. This may or may not be entirely effaced by pressure. Persons of fair complexion or thin, delicate skin are affected more greatly by the same amount of heat than will be those of darker hue or more dense integument. Swelling is present to a slight degree, and does not extend far beyond the limits actually exposed to the burning substance. This type of burn is produced by indirect contact with the flame of a lighted match, proximity to a heated metal, escaping steam, and the actinic rays of the sun. With or without treatment the effect of burning to this extent may disappear shortly after removing the exciting cause.

"Resolution takes place in this variety by the disappearance of the swelling, the serous infiltration being absorbed, the color diminishing to the normal except in those cases in which a slight degree of pigmentation is left in the form of ordinary increase, which usually disappears as time progresses or where the sun's rays cause, perhaps, a permanent stain, such as lentiginous patches. The linear fissures of the skin appear prominent because of the semidetachment of the membrane between them, which, as time passes, the new skin forming beneath compels their complete detachment in the form of minute flakes of deadened epithelium.

"In burns of the second degree the inflammation, while yet superficial, may still occupy the entire epidermis. In some cases the upper layers alone of the cuticle may be destroyed, while vesicles

or bullæ may be observed over the affected surface. In still other cases the corium is stripped entirely of its epidermal covering or particles of the membrane may be rolled into whitish masses over its exposed surface. These vesicles, or bullæ, may be produced directly by the contact of the heated article or indirectly by the consequent inflammation. They may retain their contents; or, owing to the increased flow of serum, their walls, becoming thin and losing their elasticity, rupture, thus allowing the escape of a continual discharge over the denuded surface. The true skin, which is exposed either entirely or at points, shows a highly-reddened surface, over which this continuous exudation may be observed. The papillary vessels are seen to be deeply congested, or, if ruptured, their flow of blood intermingles with the discharge of serum and gives it a tint of red. Swelling is present in both of these conditions, but will be governed by the extent of surface and the density of the part involved. In this type of condition actual contact with the heated substance takes place either in shorter or longer durations.

"Such articles as heated iron, transient or lengthened action of flames, and boiling liquids may be the exciting agent. The effects of this form of burn do not always show to what extent they have progressed immediately upon the removal of the cause because of the systemic conditions which may be induced. Pain is always present to a minor or major degree. Resolution takes place through coagulation of the serous discharge, which occupies the involved area as a fibro-albuminous covering, beneath which the new skin is allowed to form. After the new integument has progressed almost to its normal aspect this covering, which by this time has become a darkish crust, becomes loosened and falls off, exposing a thin, delicate skin, through which the more vascular structures immediately beneath are observed. It is not for weeks, months, or even years that the normal pinkish-red tint of the skin is restored. Burns of this character usually leave a fairly-normal aspect to the surface and rarely cause the formation of cicatrices. If a cicatrice is formed it is generally superficial and flattened, resembling to a marked degree the flat, sebaceous warts observed in the aged.

"In burns of the third degree the inflammation or destruction may be superficial, extending over considerable area, or deep, affecting the subcutaneous tissues, muscles, and even bones. In those of the superficial variety the extent of surface involvement may be variable, in one instance occupying a portion comparing with the size of the hand, and in others being observed upon portions ranging from six or seven inches to areas as large as one limb or even one-third or one-half of the body-surface. In this variety the epidermis alone may be destroyed and expose the corium to view, covered with particles of charred cuticle, or the corium itself may share in the destruction, being deposited over the affected areas in strips of dried eschars. The parts uncovered by these destructive influences present, either the corium or subcutaneous tissue, a highly-vascular aspect, from which there is a continuous exudation of serum intermingled with the escaping blood. The dead tissues vary in proportion according to extent of heat, its length of contact, the thinness or density of the part involved, and the amount of surface encompassed. They may be thin or thick, large or

small, and retain their hold for longer or shorter periods. Resolution takes place in the uncovered variety in the same manner as described under the foregoing degree, while in the covered variety granulations spring up beneath the charred remains, which, after a time, desiccate and fall off, exposing a similar surface to that of the second degree. In the deeper form of burn the extent of surface involved may be small or large, but may dip down to varying depths. It may be limited to the destruction of the skin (epidermis and corium) and the subcutaneous tissues, or it may expose the muscles, attack the nerve- and blood- vessels (allowing hæmorrhage), and even the bone. The amount of charring will usually be very great and will lay about in masses over the burned surface, thus preventing a view of the destruction beneath. In some cases the degree of loss will be so enormous that the bone will be entirely stripped of all covering. Hæmorrhages will often be encountered and may result fatally. Fractures of bone will occasionally complicate matters. This variety will show both the first and second degrees at areas remote from the greatest destruction. Resolution, even in the milder cases, is slow, and before such happens surgical interference may be demanded. The same appearances may be noted throughout its process as found in the superficial variety, but to a different degree. The causes which bring about this form of burning are usually dry heat (flames or contact with electric wires), and it generally causes much greater destruction than will moist heat. The effect upon the system is generally of an alarming character and shock may carry off the person before relief can even be attempted."

Burns of Mucous Surfaces.—"The mucous surfaces may be affected by the inhalation of flames, vapors (volatile or boiling acids), boiling liquids (water, slacked lime), and by certain substances acting directly, such as ammonia and sulphuric and hydrochloric acids. The mouth, pharynx, larynx, bronchi, and the œsophagus, as well as the stomach, share in the attack. The eye often, from its exposed position, is the seat of irritation. The irritation produced at these parts is often of a gentle inflammation, or ulcers may be the result. Other than in the mouth, we, unfortunately, cannot make an examination. Thompson,[1] of London, records an instance in which a roasted chestnut (which had not been nipped before cooking) burst in the mouth, causing an ulceration of both the tongue and hard palate. Conjunctivitis often results from irritants coming into direct contact with the eye, and if the exciting agent is not early removed great destruction of substance or sight may be the result."

Constitutional Effects.—"The effects of burns of the first degree upon the system are generally slight and are mostly those of pain, which disappears shortly after the removal of the exciting agent, but often may last for several hours. In burns of the second degree the pain accompanies the phenomena not alone for hours and days, but often for weeks and even months. The shock may be of a transient character or of an alarming intensity. It may be encountered at the time of accident or be delayed for periods varying from hours to days thereafter. When small areas are involved the depression may soon be relieved; but, when one-fourth or one-

[1] Lancet, vol. i, p. 368, '88.

third of the body is attacked, death may intervene, and still death rarely fails to claim the victim of burns occupying one-half of the structure. Complications of severe character are usually an accompaniment of this degree. Burns of the third degree may be so severe that death intervenes before pain has time to appear. Shock at this stage is therefore observed early and of the worst character. Early mortality is generally due to the shock, while late mortality usually occurs during the stage of suppuration. Vomiting is often observed in both the second and third degrees. Children suffer more from burns than do adults, and women more severely than men. The temperature is not affected by burns of the first degree, but is a marked symptom in those of the second and third. At the time of the accident it may decrease from one to three degrees below the normal (to 97° or even 95°) and remain at that point until reaction begins, which is in about 36 or 48 hours, when it rises during the next 12 or 18 hours to 104° or 106° or more, at which point it remains for a period of 8 or 10 days (possibly rising and lowering at irregular intervals), when granulations, now in a fair formation, act as a retarding agent."

Treatment.—The object of this article being to review the newer contributions to our list of remedies, the well-known measures employed for minor burns and which all surgeons well know will not be described. Suffice it to say that the application of bicarbonate of sodium mixed with enough water to make a thick paste, lead-water and laudanum, equal parts of white of egg and sweet oil, and white-lead paint—which causes the pain to cease almost immediately—have best stood the test of time. It must be said, however, that many newer agents are much more effective, both for minor and major injuries; these it is our purpose to review.

Picric Acid. — In superficial burns this agent has been found useful by so many observers who had employed it in a large number of cases that the adverse reports recorded are not sufficient to warrant its rejection as one of our most active agents. It not only procures rapid resolution, but its analgesic action is marked in the majority of cases when employed properly. In deep burns, however, it may give rise to toxic symptoms, and it should not be employed, especially in the case of children, Walther, Latouche, Berger, and Tuffier,[1] having reported marked cases of poisoning in the latter.

Picric acid is a product of the action of nitric upon carbolic acid. It occurs in the form of fine, yellow scales, which are soluble in water and alcohol. It is extensively used as a dye, giving a brilliant-yellow color to objects over which it is applied. Owing to this property, it stains the hands of the operator unless these be previously smeared with vaselin. Stains may also be removed from the skin by means of alcohol or soap and boric acid. D'Arcy Power, who employed it extensively, used a solution made by dissolving $1^1/_2$ drachms of picric acid in 3 ounces of alcohol, which is then diluted with 2 pints of distilled water, a saturated solution being thus procured. The clothing over the injured part should be gently removed, and the burnt or scalded portion should be cleaned as thoroughly as possible with a piece of absorbent cotton-wool soaked in the lotion. Blisters should be pricked and the serum should be allowed to es-

[1] Medical Record, Feb. 26, '98.

cape, care being taken not to destroy the epithelial surfaces. Strips of sterilized gauze are then soaked in the solution of picric acid, and are so applied as to cover the whole of the injured surface. A thin layer of absorbent cotton-wool is put over the gauze, and the dressing is kept in place by a light linen bandage. The moist dressing soon dries and it may be left in place for three or four days. It must then be changed, the gauze being thoroughly moistened with the picric-acid solution, for it adheres very closely to the skin. The second dressing is applied in exactly the same manner as the first, and it may be left on for a week.

The great advantages of this method of treatment are: first, that the picric acid seems to deaden the sense of pain; and, secondly, that it limits the tendency to suppuration, for it coagulates the albuminous exudations, and healing takes place under a scab consisting of epithelial cells hardened by picric acid. A smooth and supple cicatrix remains, which is as much superior to the ordinary scar from a burn as our present surgical scar is superior to that obtained by our predecessors, who allowed their wounds to granulate.

According to Miles,[1] the advantages of picric acid are: simplicity, painlessness, asepsis, small amount of discharge, infrequent dressings, astringent action in preventing inflammation, property of promoting the growth of epithelium, rapid separation of sloughs, absence of poisoning symptoms, and economy in dressings. Its use should cease, in his opinion, when inflammation has subsided and granulations have formed.

Thompson,[2] of St. Louis, who used it in fifty cases, states that it is advisable to let the shreds of clothing which have been burned into the skin remain until the second dressing. The cloth having been asepticized by burning, it will do no harm by remaining, while its removal can only be accomplished by stripping away the flesh. The cloth will act as a capillary drain into the skin and it will promote a permeation of the acid solution into the injured tissue. At a second dressing the thoroughly-soaked fibres can be more easily removed. Dressings soaked in a picric-acid solution do not adhere as much as other applications.

Picric acid has also been employed advantageously by Thierry,[3] Filleul,[4] Papazoglou,[5] Sila Novitsky,[6] Souter,[7] and others. The author last named simply paints the saturated solution over the burnt surface with a large camel's-hair pencil and leaves the primary dressing, covered with oiled silk and cotton-wool, on, for a period of from three days to a week. He adds that the solution is used with much success in iron-foundries and sugar-refineries, a large bowl of it being kept in readiness for emergencies. This procedure could be imitated with advantage on board of war-vessels, especially during action.

Aristol presents the advantage of being useful in burns of the second and third degrees. It occurs in crystals of a light-reddish-brown color, is soluble in water, slightly soluble in alcohol, and freely soluble in ether and fats.

In burns of the second and third degrees it has been found strikingly effective where other remedies had failed. Haas[8] states that the pain is almost instantly relieved and that healing is

[1] Brit. Med. Jour., July 17, '97.
[2] St. Louis Med. Review, Feb. 20, '97.
[3] Provincial Med. Jour., Dec. 6, '95.
[4] L'Union Pharmaceutique, Dec., '95.
[5] Thèse de Paris, '96.
[6] Bull. Méd., p. 687, '97.
[7] Brit. Med. Jour., Jan. 2, '97.
[8] Deut. med. Woch., p. 783, '94.

rapid. R. Y. McCoy,[1] to illustrate its value in ulcerative processes occurring as a result of burns, cited the case of an engineer in whom a scald had caused excessive suppuration of legs, knees, and soles. An ointment of aristol changed the appearance in twenty-four hours, and the healing process continued steadily and with unusual rapidity.

It may be used in the form of powder or mixed with oil or vaselin. The surface should be disinfected with a boric-acid lotion, and after opening the vesicles aristol is applied and the whole is covered with sterilized cotton-wool, gutta-percha paper, and a bandage. The application of aristol powder directly to the wound at the beginning hinders the dressing from soaking up the secretion; when the latter has diminished, however, aristol may be applied either alone or in a 10-per-cent. ointment with olive-oil, vaselin, and lanolin.

Walton,[2] of Ghent, has used the following ointment in the treatment of extensive burns:—

℞ Aristol, 1 part.
Sterilized olive-oil, 2 parts.
Vaselin, 8 parts.—M.

Around the edges of the burns, after the ointment is spread, he dusts the aristol in powder form. In burns of small extent he employs the powder form only. Cleanliness must be thorough whenever the dressing is changed. One of the great advantages of aristol is its freedom from poisonous effects. There is some smarting at first, but it soon passes off.

Cookman[3] states that aristol may be used in all varieties of burns, from a simple erythema of the skin to a complete charring and destruction of the tissues. In the superficial form it is best used as a powder, while in the deeper burns the following ointment is to be preferred: Aristol, 1 part; olive-oil, 2 parts; dissolve and add vaselin, 8 parts. He considers strict asepsis of the wound, however, as the first essential to success. After pricking all the blebs and permitting the serum to exude, the burn should be well irrigated with a weak solution of boric or carbolic acid, and its surroundings scrubbed with soap and water. Then with sterilized absorbent cotton the surface should be gently dried, and the aristol applied, either as a powder or an ointment. If the latter is used the wounded edges are first dusted with the powder, and then sterilized gauze on which the ointment has been thickly spread is applied. The dressing is completed with another layer of gauze, absorbent cotton, and a bandage. After three days this should be removed, the wound and adjacent parts asepticized as before, and the same dressing reapplied. By careful treatment in this manner very extensive burns will rapidly cicatrize.

Ichthyol is also efficacious in treatment of burns of the first and second degrees. Leistikow found that it allayed the pain at once. Slight, superficial burns heal rapidly. In burns of the second degree with the formation of bullæ, even when extensive areas are involved, the remedy also acts favorably. It is used dry, diluted with zinc oxide or bismuth, the powder being spread evenly over the surface; in ointment (10 to 30 per cent.); or as a combination of these two methods. The powder is the most satisfactory form in extensive burns of the first degree, and should be plentifully

[1] New England Med. Mo., Dec., '91.
[2] Practitioner, July, '97.
[3] Hahnemannian Monthly, Mar., '97.

applied. In extensive burns of the second degree the soft paste is preferable.

The zinc-oxide powder may be combined as follows:—

℞ Ichthyol, 1 to 2 parts.
Zinc oxide, 20 parts.
Carbonate of magnesia, 10 parts.
—M.

While the paste is mixed as follows:—

℞ Carbonate of lime, 10 parts.
Zinc oxide, 5 parts.
Oil, 10 parts.
Lime-water, 10 parts.
Ichthyol, 1 to 3 parts.—M.

Europhen contains about 28 per cent. of iodine, which it yields on exposure to moisture. It is similar in action to iodoform, but has the advantage of having a less disagreeable odor. Again, it is less poisonous; does not become aggregated in masses, or "cake"; and is much lighter. It is, therefore, a valuable agent in burns. It may be employed in the form of powder; but a dressing consisting of 3 parts of europhen and 7 parts of olive is to be preferred. Nolda,[1] who has used it considerably, employs the following:—

℞ Europhen, 1 part.
Vaselin,
Lanolin, of each, 10 parts.—M.

This he applies three or four times a day to burns limited to rubefaction or vesication.

As it only becomes active in the presence of moisture, its beneficial effects in the presence of secreting surfaces is obvious.

Thiol.—Thiol has been found useful for all degrees of burns. According to Bidder,[2] it allays pain very rapidly and arrests cutaneous hyperæmia. In this manner it tends to prevent ulceration and scars. Giraudon[3] has found it especially valuable in burns of the second degree, and he also observed that suppuration and cicatrices were avoided even after burns of the third and fourth degrees.

The parts are first washed with a weak antiseptic solution, and the cuticle that may be hanging loose from ruptured blisters is removed, taking care to leave intact those that have not opened. After dusting the burn with boric acid the entire surface of the burned region and the skin around it are painted with a solution of equal parts of thiol and pure water. A layer of greased cotton is then laid on the burn, and kept in place with a loose bandage.

Chloral-hydrate.—The antiseptic and sedative properties of chloral-hydrate make the application of a 5-to-30-grain-to-the-ounce solution quite useful in superficial burns.

Nitrate of Potassium.—Nitre has been found to be useful in all kinds of burns by Poggi,[4] and may be employed to great advantage when the other agents described cannot be had. It acts mainly as a refrigerant by causing notable lowering of the temperature of the liquid used as solvent.

If a burned hand or foot is plunged into a basin of water in which a few spoonfuls of the nitrate have been placed, the pain ceases rapidly; if the water becomes slightly heated, the pain returns, but it is allayed as soon as a fresh quantity of the salt is added. This bath, which is prolonged from two to three hours, may bring about the final disappearance of the pain and even prevent the production of blisters. The application of the compresses also exercises the

[1] Gaz. Heb. de Méd. et de Chir., July 11, '97.
[2] La Clinique, May, '95.
[3] Thèse de Paris, '95.
[4] Revue Méd., Feb. 16, '96.

same influence. By this means the pain is allayed and cicatrization takes place without delay.

Calcined Magnesia.—M. Vergely[1] obtained favorable results with this salt in burns of the first and second degrees. The affected parts are covered with a thick layer of paste, which is prepared by mixing the calcined magnesia with a certain quantity of water. This paste is allowed to dry on the skin, and, when it becomes detached and falls off, it is replaced by a fresh application. Very soon after the paste is applied the pain ceases, and under the protective covering formed by the magnesia the wounds recover without leaving the cutaneous pigmentation which is often observed to follow burns that have been allowed to remain exposed to the air.

Turpentine.—H. L. McInnis[2] states that spirit of turpentine applied to a burn of either the first, second, or third degree almost at once relieves the pain, whence the burn heals rapidly. After wrapping a thin layer of absorbent cotton over the burn the cotton is saturated with common commercial turpentine and covered with bandages. Being volatile, the turpentine evaporates, and it is therefore necessary to keep the cotton moistened with it. When there are large vesicles these are opened on the second or third day. It is best to keep the spirit off the healthy skin, if possible, to avoid the local irritation. Turpentine is also particularly useful when the granulations are sluggish. It is a valuable agent for the treatment of burns aboard ship, where turpentine is always on hand.

White-lead paint, referred to early in this article, was extensively used by Prof. S. D. Gross in mild and severe cases, and the results obtained were often remarkable. This excellent remedy is likewise always on hand on board ship.

General Measures. — Emphasis was laid by Paul Tschmarke, of Magdeburg,[3] upon the great importance of keeping the injured part aseptic; the patient may recover from the shock only to die of blood-poisoning. This is especially to be feared where the side of the face and the chest are extensively burnt. The wound should at once be thoroughly disinfected. He then covers it with subnitrate of bismuth, and then with iodoform gauze, kept in place by light bandages. If the bismuth powder is found to irritate the skin and the raw surface, after it has been applied for a few days, he replaces it by boric ointment. Every change of dressing should be made in a bath, in which the previous substances applied are allowed to soak off.

[1] Revue Méd., Feb. 16, '96.
[2] N. Y. Med. Record, Sept. 5, '96.
[3] Deut. Zeit. f. Chir., vol. xliv, pp. 346–392, '97.

New Books and Monographs Received.

The editor begs to acknowledge, with thanks, the receipt of the following books and monographs:—

Report on Bubonic Plague. Being a Report Based upon Observations on 939 Cases of Bubonic Plague Treated at the Municipal Hospital for Infectious Diseases at Arthur Road, Bombay, from September 24, 1896, to February 28, 1897. By Khan Bahadur N. H. Choksy, Bombay, 1897.——An Index to the Transactions of the Clinical Society of London. Vols. i to xxx. Longmans, Green & Co.,

London, 1898.——Tumor of the Spine; Compression-myelitis; Operation; Death on the Ninth Day. By J. T. Eskridge, M.D., and E. J. A. Rogers, M.D., Denver, Col., 1898.——Amblyopia from Suppression, Congenital Imperfection, or Disuse; Which or All? By Leartus Connor, A.M., M.D., Detroit, Mich., 1898.——A Series of Specimens Illustrative of Certain Congenital Affections of the Urinary Apparatus. By L. R. Sutherland, M.B., and E. H. Edington, M.D., C.M.Glasg., 1898. ——The Infection of Primary Acquired Syphilis. By I. M. Koch, M.D., Philadelphia, 1897.——Amitol in Diseases of the Skin. By I. M. Koch, M.D., Philadelphia, 1897.——Some of the Therapeutic Properties of the Thyroid Gland. By J. T. Eskridge, M.D., Denver, Col., 1898.——Calomel as a Curative Agent in Diphtheria. By Leonardo D. Judd, M.D., Philadelphia, 1897.——Mount Pocono, Pennsylvania, as a Health-resort. By L. D. Judd, M.D., Philadelphia, 1896.—— Pharyngitis Herpetica Associated with Menstruation. By Lewis S. Somers, M.D., Philadelphia, 1898.——A Description of Hospital Buildings on the Pavilion Plan. By Albert Vander Veer, M.D., Albany, 1898.——A Case of Phlegmonous Gastritis Following Ulcus Carcinomatosum of the Pylorus—Dilatation, Perforation, and Peritonitis—A Clinical History of Fourteen Months with Chemical, Bacteriological, and Histopathological Study. By John C. Hemmeter, M.B., Ph.D., M.D., and Delano Ames, A.B., M.D., Baltimore, 1897.——Experience with Pilocarpine in the Treatment of the Uræmia of Bright's Disease. By Charles J. Proben, M.D., New York City, 1896.——Report of a Case of Floating Spleen in an Infant following Malaria. By Charles I. Proben, New York City, 1895.——Malarial Fever in Infancy and Childhood; Its Etiology, Symptomatology, and Treatment. By Charles I. Proben, M.D., New York City, 1895.——Certain Conditions of the Tonsils which Limit the Usefulness of the Tonsillotome. By Arthur Ames Bliss, A.M., M.D., Philadelphia, 1898.

CONSECRATION.

Upon red battle's awful verge,
We lift suppliant hearts to Thee—
Who, throughout all the years,
Hast ruled above the free.

Not in the pride of power,
Not in the hope of gain,
We move with battle-flags
Upon the ranks of Spain.

Not because that we are strong,
Not because that she is weak,
Do we to battle come,
Do we her armies seek.

Not because of ancient wrongs,
Done to patient, subject lands,
Have we placed the gage of war
In the Spaniards' bloody hands.

But we hear upon the southern wind
A helpless, suffering people's cry,
Borne across the gulf-stream's rushing wave,—
"Bring to us succor, or else we die."

'Tis to Thee we owe our power;
To Thee we owe our country fair;
'Tis from Thee all blessings come;
To Thee we lift our humble prayer.

And Thou hast taught in ancient days,
To save the weak from bitter wrong.
They cry aloud in sore distress,—
They who are weak—to us the strong.

We come not hither to avenge;
No conquest calls across the wave;
We only do Thy holy will:
To right the wrong, the weak to save.

Let not the haughty pride of power,
The love of battle's fierce array,
Lead us from the narrow path,
Our sense of right and justice sway.

Thine to avenge the wrong,
Ours to uphold the right;
Lead us onward, oh Lord, we pray!
Protect us from dark error's night.

And with hearts sustained by Thee,
Now let us forward steadfast go;
The war-drums roll, the bugles call,
To do Thy will we seek the foe.

—Frank Alaston Davis.

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In a recent contribution to the *Medical News*, November 27, 1897, by Prof. R. W. Wilcox: **"A Phase of the Treatment of Goutiness,"** the author arrives at the following conclusions:

"That Piperazine, administered in the form described (Piperazine Water) in this paper, is the remedy of choice for the elimination of uric acid, not only in this (neurotic lithemia) but in other pathologic conditions dependent upon the same cause."

PIPERAZINE WATER IS SUPPLIED IN CHAMPAGNE QUARTS. DAILY DOSE ONE BOTTLE.

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NOTES AND COMMENTS.

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Eupeptic Hypophosphites.—R. A. Jamieson, Professor of Clinical Medicine, Detroit College of Medicine, in writing to Nelson, Baker & Co., says that six or seven years ago he made the first test of their eupeptic hypophosphites in a severe case of nervous dyspepsia in his own person. The distressing conditions were so soon and so effectually relieved that he has been prescribing the preparation for similar cases constantly ever since.

Another of their preparations he has become very familiar with is the uterotonic. He prescribes it almost daily in his practice. It has proved a valuable remedy in dysmenorrhœa and menorrhagia, and in many other conditions of uterine and ovarian irritation.

"Summer Homes."—We are in receipt of a booklet, containing 172 pages, issued by the Passenger Department of the New York, Ontario & Western Railway for 1897, entitled "Summer Homes." They are about issuing one for this year, and will be pleased to send it to any of our subscribers who desire a healthy, as well as pleasant, place to spend their vacation. The intention of the booklet is to supply authentic information regarding the hotels, boarding- and farm-houses along their line. The territory covered in the booklet includes the counties of Orange, Sullivan, Ulster, Delaware, and Chenango in New York State—"A section abounding in beauty—with their mountain-summits rising three thousand feet above the sea; their narrow, exquisitely lovely valleys; their cold, crystal streams and water-falls, and numberless gem-like lakes; their rugged mountain-sides, with their heavy growth of forest-woods." The entire region is free from all malarial fevers. Its dryness and uniformity of temperature make it a desirable region the entire year for persons afflicted with pulmonary or rheumatic diseases. That the region mentioned is favorably regarded by physicians, is shown by the number of testimonials from eminent physicians published in the booklet. From many we quote the following two:—

Dr. Andrew J. Sauer, Associate Professor of Chemistry, Baltimore University, writes: "I have been over your road, as far as Ellenville, at least ten times, and although I have seen the country pretty generally, I prefer Ulster County for scenery to any part of the world. I have experienced great delight and recuperation in Ulster County, and have no hesitancy in saying it is particularly healthy. I have personally analyzed the water there from different parts, and find it to be pure, colorless, and tasteless, yet having a percentage of calcium and magnesium salts. I heartily indorse that part of the country."

Dr. Malcolm McLean, 29 East One Hundred and Twenty-sixth Street, New York, writes: "I consider Sullivan County, in this State, a very healthful section, and should not hesitate to recommend it as a location for summer pilgrims."

The booklet is prettily illustrated, and much useful information is obtained from it regarding the region referred to,

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Notes and Comments (continued).

and we would be pleased if our subscribers would make requisition for a copy of it, if they are thinking of going to a place that would be delightful during the summer months. We refer them to the company's advertisement on page 39 for fuller information.

Siasconset, on the southeast corner of Nantucket Island, has, without doubt, the finest summer climate of any point on the whole Atlantic coast, as shown by the large number of favorable testimonials from eminent physicians in this and other cities, as well as from others who have visited various resorts and have been privileged to spend a summer on the island. Owing to the nearness of the gulf-stream there is water warm enough to bathe in with pleasure from the middle of June until the middle of September. The surf is fine, and there being no treacherous undertow it is considered safe at all times. The whole island of Nantucket is delightful in summer. Siasconset is not a fashionable resort. People live and dress to suit themselves. "It is the place for health and rest,—quaint in many ways,—pleasant drives, beautiful wild flowers (acres of them), ferns, berries, light-houses, life-saving stations, and many objects of interest. Bicycling, croquet, tennis, etc., are indulged in at pleasure."

Under date of August 31, 1897, the late Dr. Harrison Allen, of the University of Pennsylvania, wrote: "I believe that Nantucket is the best health-resort on the Atlantic coast." Dr. Allen's cottage was at Siasconset.

Dr. Charles A. Oliver, of Philadelphia, has a cottage at Siasconset, and, among other things, says it is an immense ocean sanitarium, moved sufficiently away from the main-land to escape all of the distressing and disturbing social and business influences with which the rest of the year is so persistently fraught.

In this connection we desire to mention the Atlantic House, which will be open from June 1st to October 1st. The house has a choice location on high ground. Fine view of sea and moors; sufficient distance from other houses to insure comfort. It is especially desirable for ladies and families. Rates are reasonable. Write after the 1st of May to G. H. Brinton, Siasconset, Mass., for circular and rates.

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For further information, apply to nearest ticket agent or address John R. Pott, District Passenger Agent, C. M. & St. P. R. R., 486 Williams Street, Williamsport, Pa.

Maltzyme.—Maltzyme is an improved diastasic extract of malt, containing an unusually large proportion of diastase, together with the phosphates of the grain. It is, therefore, extremely well

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Notes and Comments (continued).

adapted to be of service in those cases, so common at all periods of life, in which starchy food is imperfectly digested. As these errors are particularly frequent in early life, malt will be found of decided benefit in promoting the nutrition of puny children.

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Price-list of Parke, Davis & Co. — Though intended primarily as a price-list of their preparations, this publication contains much useful information in the form of tables and an extensive property- and dose- list.

Iodothyrine in the Treatment of Obesity.—Since the introduction of thyroid feeding in the treatment of obesity the necessity of a strict regimen no longer exists. The only obstacle to the more extensive use of thyroid preparations is the fact that some persons are unable to take them without experiencing unpleasant and even serious after-effects. This disadvantage does not attach, however, to the active principle of the gland, which has been introduced in form of a triturate with sugar of milk

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Notes and Comments (continued).

under the name of "iodothyrine." Owing to uniform and definite composition iodothyrine admits of an exact dosage.

Neurasthenia. — Under the title "Observations upon the Treatment of Some Cases of Neurasthenia" Dr. Jerome K. Bauduy, of St. Louis, publishes in the Medical Review a paper embracing a clinical report by Dr. Keating Bauduy and a microscopical report by Dr. C. Fisch. The author speaks of the value of organic salts of iron, especially in the female, where functional derangements exist. From Gude's preparation, "liquor mangano-ferri peptonatus" (pepto-mangan) he obtained excellent results in a large number of cases. His experience had led him to believe that iron and manganese in combination are indicated in the vast majority of cases of neurasthenia, and he is convinced that this particular remedy will prove a great boon both to the patient and physician. It is maintained by some that in the hæmoglobin of the red blood-corpuscles manganese is present as well as iron. Dr. Bauduy has for years obtained results

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The Proper Treatment of Headaches.—J. Stewart Norwell, M.B., C.M., B.Sc., House Surgeon in Royal Infirmary, Edinburgh, Scotland, in an original article written especially for Medical Reprints, London, Eng., reports a number of cases of headache successfully treated, and terminates his article in the following language:—

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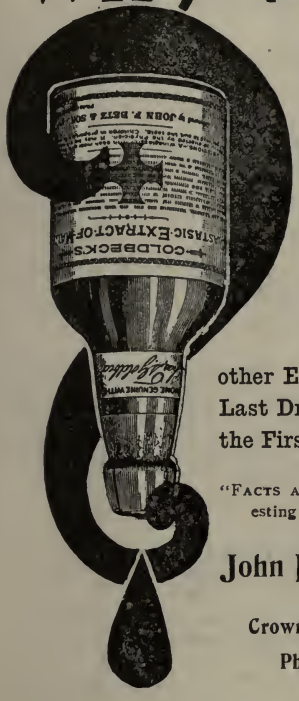

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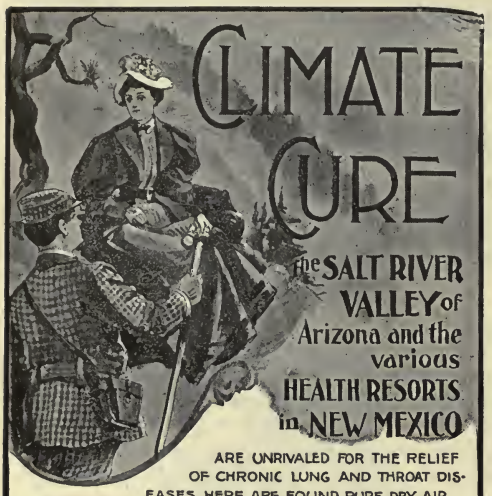

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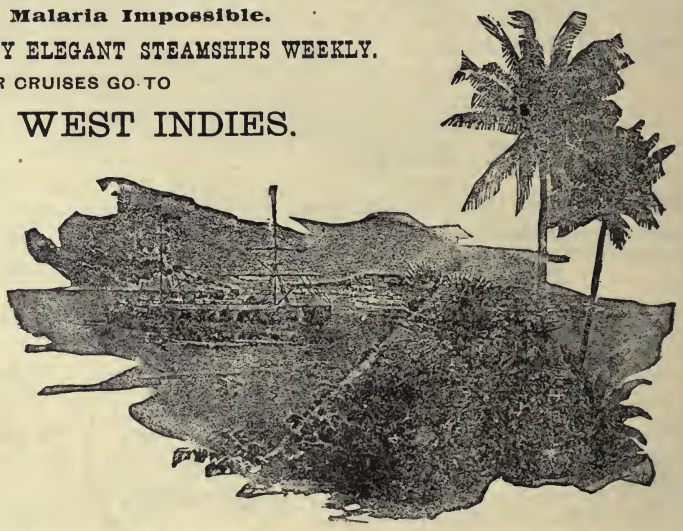

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P. S.—Upon the reverse side of this announcement will be found a specimen page of Grandin and Jarman's "Obstetric Surgery."

Specimen page from Grandin and Jarman's "Obstetric Surgery."

As the cord comes down it is to be drawn upon from the *placental* side, and if it is over one of the legs it must be released (Fig. 53) and placed in the most favorable position as regards pressure. In rare instances it will be impossible to draw the cord down without making undue traction. If such should prove to be the case, it should be secured by means of two artery-clamps and cut. Of course, if this is done, it will be necessary to hasten the delivery as much as possible.

When the scapulæ appear the arms must be liberated before extraction is continued. Under favorable circumstances, —that is, if the assistant has kept up intelligent pressure on the fundus, or if the cervix was fully dilated previous to the

Fig. 53.—Method of Releasing the Cord.

version, or if the operator has not made traction in too rapid a manner,—the arms will be folded on the chest and their extraction will be easy.

Even in the hands of the best operators and with the best assistants the arms sometimes become unavoidably extended. Although their extraction must be accomplished in as rapid a manner as possible, there is no need of breaking the arm if care is taken.

The arm which is to the rear is usually more easily liberated. To do this the operator seizes the legs with one hand and carries the child's body well upward. This will cause the posterior shoulder to be more readily reached, and will permit more room for the manipulations necessary. Two fingers of

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